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BEARTOOTH MOUNTAINS
Oil & Gas Leasing

FINAL
Environmental Impact Statement

April 1993

United States
Department of
Agriculture

Forest Service

Custer National Forest

Cooperating Agency

United States
Department of
Interior

Bureau of Land Management

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**United States
Department of
Agriculture**

**Forest
Service**

Custer NF

**2602 1st Avenue North
P.O. Box 2556
Billings, MT 59103**

Reply to: 1950/1620

Date: April , 1993

Dear Reader:

We appreciate your continued interest in our analysis and decision concerning oil and gas leasing on the Beartooth Ranger District of the Custer National Forest. We are nearing the end of this process.

We received a lot of valuable feedback as a result of issuing the draft EIS. Most of that feedback has been incorporated into the final EIS in one form or another. Some had to do with the way we presented the results of our analysis. We have made substantial changes in this area, and we hope that you find this document a much easier one to read. Other feedback lead us to develop another set of alternatives, a new "availability" alternative (B1) and a new "leasing" alternative (4A). These new alternatives are identified as the Forest Service preferred alternatives.

With the release of this final EIS, our analysis is all but done. Shortly I'll be making my final decision and presenting it in a Record of Decision, which will also contain the rationale for my decision. I will send copies of this ROD to all of you who have requested it, as well as publish a notice in the Billings Gazette when it is available.

Thank you for your input and participation in this process.

Sincerely,

CURTIS W. BATES
Forest Supervisor

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Environmental Impact Statement

Beartooth Mountains

Stillwater County, Montana

Lead Agency:	USDA, Forest Service Northern Region P.O. Box 7669 Missoula, MT. 59807
Cooperating Agency:	USDI, Bureau of Land Management Montana State Office 222 North 32nd Street P.O. Box 36800 Billings, MT. 59107-6800
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Alternative 4A with availability alternative B1 is the preferred alternative.

Abstract: The Enviromental Impact Statement documents internal and public scoping, identification of issues, alternatives developed to address the issues, and the environmental effects of the alternatives if they were implemented on the Beartooth Ranger District of the Custer National Forest. The availability alternatives considered are: Alternative A - All Lands Not Available; Alternative B - Lands Available under Forest Plan Decision (No Action); Alternative B1 - Modified Forest Plan; and Alternative C - All Lands Available. The analysis presents a mix of administratively available lands in the following leasing alternatives: Alternative 1 - No Action/No New Leasing; Alternative 2 - highly restrictive with emphasis on maximum protection of surface values; Alternative 3 - a transition between the most restrictive leasing proposal and the Forest Plan Alternative 4; Alternative 4 - implementation of the approved Forest Plan; Alternative 4A - Modified Forest Plan and preferred alternative; and Alternative 5 - the least restrictive proposal removes most of the Forest Plan stipulations except for the most critical areas.

April, 1993

Cover Photo:

Looking up Rock Creek Canyon from an overlook
point on U.S. 212 at elevation 9180 feet.

SUMMARY

INTRODUCTION

This Final Environmental Impact Statement (FEIS) discloses the environmental consequences of following various oil and gas leasing alternatives on the portion of the Beartooth Mountains that lies within the Custer National Forest, Montana. Chapter 1 discusses the proposed action, the decisions to be made, the purpose and need, and authority for these decisions. Chapter 2 outlines the issues that are pertinent to the analysis and the alternatives to the proposed action. Chapter 3 describes the affected environment, and Chapter 4 discloses the environmental consequences of implementing the various alternatives. Chapter 5 contains a summary of the public involvement process and the comments received through this effort.

CHAPTER 1

Summary of Proposed Actions

The Forest Service (FS) proposes to authorize the Bureau of Land Management (BLM) to lease certain National Forest System (NFS) lands for oil and gas exploration and possible development in the Beartooth Mountains that lie within the administrative boundaries of the Beartooth Ranger District, Custer National Forest. The FS proposes the following specific actions:

- The FS will display which National Forest System lands within the boundary of the Beartooth Ranger District are "administratively available" for oil and gas leasing.
- For lands determined to be "administratively available", the FS will identify specific lease stipulations applicable to those lands.
- Within the lands determined to be "administratively available", the FS proposes to authorize the BLM to offer specific National Forest System lands for leasing, as well as identify lands that, even though "administratively available", may not be offered for lease at this time.

Alternatives to the proposed actions are described in detail in Chapter 2 and are analyzed in Chapter 4.

Decisions to be Made

The two decisions to be made based on the analysis disclosed in this FEIS will determine future actions regarding federal oil and gas leasing in the Beartooth Mountains portion of the Beartooth Ranger District. The first decision is whether lands are "available" or "not available" to lease. The second decision, following examination and display of lands "administratively available", is to address what lands, if any, should be authorized for lease, and if leased, what would be the appropriate surface resource mitigation to apply. Public comments received on the draft EIS released in October, 1992 have been incorporated.

Authority for the Decisions

The authority to issue all leases for the exploration and production of federally owned oil and gas resides with the BLM. Under current regulations, FS decisions to lease with certain stipulations are binding on the BLM for all federal minerals on National Forest System lands.

Purpose and Need

The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of domestic mineral and energy resources on NFS lands to help meet the present and future needs of the nation. The purpose of this analysis is to identify those lands on the Beartooth Ranger District which are available for oil and gas leasing, identify other resources on the District which could be affected by availability and leasing decisions and what those effects are, then identify stipulations which could mitigate effects of exploration or development on those resources.

This area has experienced peripheral oil and gas exploration since the late 1880s. Approximately 47 exploration wells were drilled within the analysis area between 1950 and 1990, but only six of these wells were within the decision area. About 46,000 acres are currently leased within the area, and industry has expressed continuing interest in leasing specific lands.

Reasonably Foreseeable Development (RFD) Scenario

The basis for estimating effects of oil and gas activities is the Reasonably Foreseeable Development (RFD) scenario. This RFD is based on what the best current scientific evidence projects will be the likeliest number and locations of oil and gas wells in the area over the next 15 years. The RFD for this analysis projects that four wells will be drilled, and that three of these will be dry holes. The projection is actually that even the fourth well, although it might encounter oil or gas, would not find enough to produce commercially. However, in order to estimate what environmental effects would be from development, this fourth well is being analyzed as if it were a producing oil well.

CHAPTER 2

Environmental Issues

The issues used in this analysis were developed by the interdisciplinary team charged with managing the planning process for this environmental impact statement, and include careful consideration of all comments and input received from respondents during the scoping process. Scoping included responses to a mailed information package and a series of open meetings held in Billings, Columbus, and Red Lodge. These issues were placed into one of three categories (Ecosystem Integrity, Natural Setting, and Social/ Economics) which are summarized below:

Changes to Ecosystem Integrity

1) What will be the effects of oil and gas activities on soils and Vegetation?

2) What will be the effects of oil and gas activities on fish and wildlife habitat and populations?

Natural Setting

3) What will be effects from oil and gas activities on aesthetics?

4) What will be effects from oil and gas activities on recreation?

5) What will be the effects from oil and gas activities on cultural resources?

6) What will be effects from oil and gas activities on inventoried roadless areas and designated wilderness areas?

Social and Economics

7) What are the effects of oil and gas activities on quality of life?

8) What are effects to economic stability and revenue?

Alternatives Considered

This analysis presents two sets of alternatives. The first set represents the "availability" alternatives (designated by letter - A, B, B1, and C) that are designed to address the "availability decision". The second set represent the "leasing" alternatives (designated by number - 1, 2, 3, 4, 4A, and 5) and are designed to address the "leasing decisions".

Availability Alternatives

Under **Alternative A,** all of the National Forest System lands in the decision area would be administratively **not available** for leasing. This alternative minimizes the potential to develop Federal mineral resources and provides a baseline against which to compare effects of other activities in the area. Selecting it would require amending the Forest Plan.

Alternative B represents the current course of action as detailed in the Forest Plan and allows for comparison of differences between the other availability alternatives. All lands in the decision area would be administratively available for leasing except approximately 860 acres of "the core" of Line Creek Management Area C, or that area not accessible by directional drilling. For this alternative, no amendment to the Forest Plan would be necessary.

Alternative B1 is the Forest Service preferred "availability" alternative. It uses Alternative B as a starting point and makes some changes in availability to address some key issues identified in the analysis and public comment process. This alternative makes the following lands administratively not available for leasing: the top of Line Creek Plateau and the adjacent lands sloping to the north toward the Beartooth Highway, a strip of land one-half mile wide on either side of the Beartooth Highway, the southwestern corner of Line Creek Management Area C, all developed recreation sites, and the West Fork Rock Creek Drainage. All other lands within the decision area would be administratively available for leasing, including the "core" area of Line Creek Management Area C. Implementing this alternative would require amending the Forest Plan.

Alternative C maximizes the potential for utilization of Federal mineral resources by making all National Forest System lands within the decision area available for leasing, including the core of Line Creek Management Area C. Selecting this alternative would also require an amendment to the Forest Plan.

TABLE 1
ACREAGE SUMMARY OF AVAILABILITY ALTERNATIVES

	ALT. A	ALT. B	ALT. B1	ALT. C
Available Acres	-0-	177,250	124,230	178,110
Not Available Acres	178,110	860	53,880	-0-
Total Decision Area	178,110	178,110	178,110	178,110

Leasing Alternatives

The availability decision is concerned with the fluid minerals resource located beneath the surface. Accessing this resource requires occupancy of the surface with some surface disturbing activities and resulting environmental effects. Leasing alternatives developed in the final EIS respond to public involvement at both the initial scoping phase and the comments received from the draft EIS. Throughout the analysis the availability alternatives are considered with the leasing alternative analysis.

Alternative 1 incorporates the most stringent mitigation measures to protect the surface and sub-surface environments short of not making the lands available or withdrawing from mineral entry. It incorporates alternative B as the basis for fluid mineral availability. Under this alternative there would be no new leasing of the available acres of National Forest System lands. No amendment to the Forest Plan would be required, since a decision of availability does not commit the responsible official to offer these lands for lease. None of the four hypothetical well sites discussed in the RFD scenario will be analyzed because leasing and subsequent occupancy are precluded in this alternative.

Alternative 2 emphasizes limiting activity that might affect wildlife, recreation, or other resources or uses in the area. It incorporates alternative B as the basis for fluid mineral availability. Most of the acreage administratively available for leasing would not be occupied by oil and gas exploration and development activities, since they would either not be offered for lease at this time or would be leased with a No Surface Occupancy (NSO) stipulation. None of the four hypothetical well sites discussed in the RFD scenario will be analyzed because occupancy is precluded in this alternative. To implement this alternative, the Forest Plan would require amending.

Alternative 3 forms a transition between the most restrictive leasing alternative (2) and the Forest Plan alternative (4). It incorporates alternative B as the basis for fluid mineral availability. It incorporates new wildlife information (e.g., data on moose, goats, etc.) not available when the Forest Plan Record of Decision was signed. Stipulations applied in this alternative allow comparison with the Forest Plan in specific areas and either confirm the appropriateness of the stipulations applied in the Plan or demonstrate that conditions and/or information have changed that may require a Plan amendment. This alternative proposes two hypothetical well sites for purposes of estimating effects. It would require a Forest Plan amendment to implement.

Alternative 4 incorporates the desired future condition and goals for each management area, and proposes leasing of specific lands using the standards, guidelines, and stipulations approved in the Forest Plan and Record of Decision. It incorporates alternative B as the basis for fluid mineral availability. This alternative proposes four hypothetical well sites for purposes of analysis, and would not require an amendment to the Forest Plan.

Alternative 4A is the Forest Service preferred "leasing" alternative. It incorporates alternative B1 as the basis for fluid mineral availability. It uses Alternative 4 as a starting point and makes some changes in resource direction to address certain key issues identified in the analysis process. It also incorporates a change from the other alternatives in the definition of what activities would be covered by the NSO stipulation. Under this alternative, the NSO stipulation would be written to disallow all facilities associated with the exploration and development of the oil and gas resource, including road, pipeline and powerline development. Under this alternative some additional administratively available lands would not be leased at this time. In addition, some of the new wildlife information incorporated in Alternative 3 would also be incorporated in this alternative. The general NSO stipulation for wildlife in Line Creek Management Area C would be replaced with stipulations designed for each specific resource. For purposes of analyzing potential effects, two hypothetical well sites from the RFD scenario would be included. Implementing this alternative would require amending the Forest Plan.

Under **Alternative 5** most of the administratively available lands would be proposed for leasing using standard lease terms. It incorporates alternative C as the basis for fluid mineral availability. Only certain key resources would be protected with more restrictive stipulations, such as grizzly bears, eagles, riparian areas, developed recreation sites, and the Beartooth Scenic Byway. This alternative represents the least restrictive proposed, and helps to define a clear justification for the level of stipulation chosen in the final decision. This alternative proposes four hypothetical wells to be drilled during the next 15 years. One would be anticipated to be a producing oil well. This alternative would require amending the Forest Plan.

TABLE 2
ACREAGE SUMMARY OF STIPULATIONS BY LEASING ALTERNATIVE

	ALT. 2		ALT. 3		ALT. 4		ALT. 4A		ALT. 5	
STIPULATION	ACRE	%	ACRE	%	ACRE	%	ACRE	%	ACRE	%
No Lease	53,800	30	-0-	0	-0-	0	6,840	4	-0-	0
No Surface Occupancy	107,030	60	147,720	83	135,590	76	85,810	48	6,510	4
Timing Limitation	200	<1	9,980	6	4,310	2	12,700	7	11,270	6
Controlled Surface Use	1,600	<1	1,630	<1	2,330	1	30	<1	20,780	12
Timing Limitation/ Controlled Surface Use	-0-	0	-0-	0	-0-	0	470	<1	-0-	0
Standard Terms	14,620	8	17,920	10	35,020	20	18,380	10	139,550	78
Total Available Area	177,250		177,250		177,250		124,230		178,110	

CHAPTER 3

This chapter describes the existing environmental, social, and economic conditions that may be affected by implementing the alternatives described in Chapter 2. The resources referred to are those identified through both internal and public scoping that are expected to have major effects as a result of oil and gas development. These resources are carried through the analysis along with human quality of life and economic consideration.

Oil and Gas Resources

In an unconstrained scenario, approximately ½ percent of the decision area has a high potential for oil and gas development, 16 percent has moderate potential, 57 percent has low potential, and about 26½ percent has very low potential. Approximately 46,000 acres of National Forest System lands within the decision area are currently under lease. Six exploratory wells have been drilled in the decision areas from 1950 to 1990.

Soil and Vegetation Resources

Most of the soils in the area have been glaciated and are relatively young and undeveloped. About half of the area consists of fragile or high hazard soils. There are numerous vegetative land forms and cover types present, ranging from alpine, to steep and rocky forested slopes, to valley bottoms and riparian areas. There are approximately 390 known plant species found on the Beartooth Plateau.

Air and Water Resources

The Stillwater River and Rock Creek drain most of the analysis area. The West Fork of Rock Creek is the municipal water supply for the town of Red Lodge. With a few exceptions, the quality of the ground water supply is excellent. Air quality is also good throughout the analysis area, because of limited development and excellent wind dispersion.

Fish and Wildlife Resources

The one fish species of concern that is known to be in the area is the Yellowstone Cutthroat Trout, a sensitive species. There are four threatened and endangered species and nine sensitive species of wildlife that are discussed. Not all have been documented in the area, but their potential habitat is known to be present. In addition, the important habitat for elk, moose, deer, bighorn sheep, mountain goat, black bear, pronghorn, and mountain lion has been identified and is discussed. This is also true for the ruffed grouse, northern goshawk, marten, wolverines, and three species of raptors.

Natural Setting - Visual Resources

The decision area is dominated by the Beartooth Mountains, which has been extensively glaciated and present a landscape that is diverse and very scenic. All major highways to and through the decision area provide a variety of view points, viewing angles, and viewing durations. Most of these highways have a visual quality objective of retention along their foreground.

Recreation Resources

The Beartooth Ranger District receives the highest level of recreation use of any Ranger District on the Custer National Forest. The District maintains 16 developed campgrounds within the analysis area.

Cultural Resources

Based on existing inventory data, 44 recorded cultural resource sites are located within the decision area boundary that could be affected by oil and gas exploration and development. Twelve of these sites are historic, 27 are prehistoric, and five may have traditional values.

Roadless and Wilderness Resources

There are seven inventoried (RARE II) roadless areas that occur totally or partially on the Beartooth District within the decision area. The portion within this area totals 83,910 acres. The Absaroka-Beartooth Wilderness is located adjacent to, but is not within the decision area.

Quality of Life

The decision area is located within and immediately adjacent to three counties: Carbon and Stillwater Counties in Montana, and Park County in Wyoming. The demographics, community services and facilities, and attitudes, beliefs and values for these three counties are discussed.

Economics

Agriculture in Carbon and Stillwater Counties accounts for a larger percentage of the county labor income than statewide in Montana. For Park County, Wyoming, agriculture labor income is marginally profitable, but the lack of profitability understates the importance of agriculture to the economy of the county. Mining, which includes the oil and gas industry, is a significant source of labor income in Stillwater County, but is relatively less important than in the other two counties. Many businesses in the three counties are directly or indirectly dependent upon recreation and tourism, but it is difficult to quantify the economic impacts associated with these activities.

CHAPTER 4

This chapter discloses the potential environmental effects and consequences that could result from implementation of the alternatives considered. The environmental effects are described in terms of direct and indirect effects and cumulative effects.

General and Site Specific Consequences

At the decision area level, potential consequences associated with oil and gas exploration, development, and production activities are discussed relative to the resources as outlined and mapped in Chapters 3 and 4. This is in recognition that activity can occur on any location of a particular lease unless, by stipulation, that activity is controlled or precluded. To test the site-specific effectiveness of the mitigation measures *and to provide a basis for addressing cumulative effects*, four well sites have been identified through the Reasonably Foreseeable Development (RFD) analysis. Even though the location of these well sites is highly speculative, the environmental consequences expected at these locations is considered to be representative of the effects across the area as a whole and/or at locations with similar characteristics. *Taken together, these well sites also provide the basis for measuring the cumulative effects that may result from reasonably foreseeable activity under the various alternatives.* This level of analysis provides additional site-specific support for the specific lands decision.

Geographic Information System (GIS).

A geographic information system (GIS) was used in the analysis of effects to identify the location of the various resources, and how they occur relative to one another. GIS was also used to portray how stipulations applied for the protection of one resource affected the others.

Common Conditions Affecting Impacts to All Resources

Impacts from oil and gas development can vary based on the stipulations that are applied to a piece of ground under the various alternatives. Following is a brief description of lease stipulations and their effects on oil and gas development.

No Leasing: (NL): No leasing is not a stipulation but is included so the reader understands that this is an option available. Application of NL would generally not have any impact on a resource, except for the possible loss of an opportunity for oil and gas development.

No Surface Occupancy (NSO): With a No Surface Occupancy stipulation, use or occupancy of the land surface for fluid mineral exploration or development is prohibited. Well pads (also roads and other ancillary facilities under Alternative 4A) are not permitted on areas with an NSO stipulation, unless a waiver, exception, or modification (WEM) is requested and granted. In general, there would be little to no effect on a resource that would be protected by this stipulation.

Timing Limitation (TL): The TL stipulation limits drilling or construction for periods greater than the 60 day period of Standard Terms but less than the year-round limits of NSO. In situations where potential impacts are seasonal in nature (such as occupancy of a seasonal wildlife range), application of a TL stipulation would avoid any adverse effects to that resource.

Controlled Surface Use (CSU): The CSU stipulation is used to protect such things as the visual resources. They notify potential lease purchasers of special requirements or values to be protected, or of special mitigation measures that may be needed.

Standard Lease Terms (ST): *Standard terms apply to all leases,* and allow some discretion in moving or delaying proposed activities to avoid a localized environmental impact. ST also provides for protection of cultural resources, species listed under the Endangered Species Act, riparian areas, and floodplains.

There is a direct relationship between the presence of a resource, its required protection, and the application of the various stipulations described above. Table 3 summarizes and compares alternatives based on the stipulations applied. Issues are compared on the basis of the total alternative proposed, which is the net effect of the stipulations applied to each of the individual resources. It takes into account the hierarchy of stipulations as displayed on the alternative maps in the FEIS. The No Surface Occupancy stipulation "trumps" all other stipulations, so effects of the less restrictive stipulations are not considered.

TABLE 3
COMPARISON SUMMARY OF ISSUES BY ALTERNATIVE

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
SOILS, AIR, WATER AND VEGETATION								
High hazard and fragile soils	Area affected	94,080	All NL-No Effects	120 NA; 24,490 NL; 69,470 NSO-No effects	120 NA; 93,960 NSO-No effects	120 NA; 90,700 NSO; 280 TL; 2,980 ST- No effects	27,930 NA; 5,230 NL; 60,920 NSO- No effect	2,690 NSO; 4,210 TL; 16,010 CSU; 71,170 ST- 73% of these soils could receive increased surface runoff and erosion from ground disturbance
Riparian/floodplains/ wetlands	Area affected	8,650	All NL-No Effect	40 NA; 2,030 NL; 6,580 NSO- No effect	40 NA; 8,610 NSO- No effect	40 NA; 8,810 NSO-No effect	2,080 NA; 1,110 NL; 5,280 NSO- No effect	5,730 NSO; 20 CSU; 3,080 ST- 33% of the riparian resource could experience ground disturbance. A Lease Notice will be applied to mitigate by avoidance
Sensitive Plant Habitat	Area affected	18,740	All NL-No effect	10,790 NL; 120 NA; 7,680 NSO; 150 LN- Mostly no effect; 1% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	17,370 NSO; 1,200 TL; 60 CSU; 110 LN- Mostly no effect; 1% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	15,930 NSO; 270 TL; 870 CSU; 1,670 LN- 15% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	11,940 NA; 2,120 NL; 4,210 NSO; 120 TL; 220 LN- Mostly no effect; 2% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	1,290 NSO; 840 TL; 3,680 CSU; 10,820 LN; 2,030 ST- 93% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered
THREATENED, EN-DANGERED AND SENSITIVE SPECIES								
Golden Eagle	Disturbance surrounding known nest sites	4,380 within 1 mi radius	Ground disturbances precluded, entire decision area NL-No Effect	All NSO-No Effect	1,290 NSO; 3090 ST- May be some effects to one or more nest sites	920 NSO; 370 TL; 3090 ST- May be some effects to one or more nest sites	Same as Alterative 3	510 NSO; 3870 ST- May adversely affect one or more nest sites

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
Grizzly Bear (TE) - MS 1	Habitat affected	2,740	All NL-No effect	Same as Alternative 1	All NSO; Lease Notice also attached-No effect	Same as Alternative 3	Same as Alternative 1	660 NSO; 2,080 TL- May have adverse effect
Grizzly Bear (TE) - MS 2	Habitat affected	4,360	All NL-No effects	All NSO-No effects	Same as Alternative 2	Same as Alternative 2	2,890 NL; 1,470 NSO - No effects	380 NSO; 3,980 ST- May have adverse effect
Yellowstone Cutthroat Trout (S)	Changes in water quality	210	Ground disturbances precluded-No effects	310 NL; 300 NSO; 60 LN	530 NSO; 70 TL; 70 LN- LN would result in application of measures adequate for protection of this species	340 NSO; 120 TL; 70 CSU; 140 LN- LN would result in application of measures adequate for protection of this species	240 NA; 210 NL; 90 NSO; 50 TL; 80 LN- LN would result in application of measures adequate for protection of this species	180 NSO; 10 TL 220 CSU; 260 LN- LN would result in application of measures adequate for protection of this species
BIG GAME AND OTHER SPECIES								
Elk	Winter/spring range affected	13,150	All NL-No effect	800 NA; 4,860 NL; 7,440 NSO; 50 TL-No effect	800 NA; 11,420 NSO; 930 TL-No effect	800 NA; 11,100 NSO; 1,250 TL-No effect	3,800 NA;6,440 NSO; 2,910 TL-No effect	11,840 NSO; 1,130 TL; 180 ST- Some displacement anticipated
	Summer/fall range affected	26,150	All NL-No effect	8,390 NL; 17,570 NSO; 10 TL-No effect	21,150 NSO; 5,000 TL-No effect	17,080 NSO; 400 TL; 8,670 ST-Displacement anticipated on some herds	9,180 NA; 9,050 NSO; 7,920 TL-No effects	760 NSO; 4,380 TL; 2,980 CSU; 18,030 ST- Displacement anticipated on all herds
Bighorn sheep	Winter/spring range affected	11,210	All NL-No effect	4,860 NL; 6,350 NSO- No effect	10,900 NSO; 310 TL- No effect	10,380 NSO; 830 TL- No effect	3,440 NA; 640 NL; 6,490 NSO; 640 TL- No effect	570 NSO; 840 TL; 3,480 CSU; 6,320 ST- Displacement anticipated
Moose	Winter/spring range affected	13,630	All NL-No effect	All NSO-No effect	8,330 NSO; 5,300 TL- No effect	5,800 NSO; 5,290 TL; 70 CSU; 2,470 ST- Displacement anticipated	500 NA; 5,980 NSO; 6,920 TL; 230 ST- No effect	730 NSO; 310 TL; 12,590 ST- Displacement anticipated
	Summer/fall range affected	1,170	All NL-No Effect	All NSO-NO Effect	NSO 850 acres; TL 320 acres- No Effect	NSO 830 acres; TL 20 acres; ST 320 acres- Some displacement anticipated	NA 430 acres; NSO 420 acres; ST 320 acres- Some displacement anticipated	NSO 70 acres; ST 1,100 acres- Displacement anticipated
AESTHETICS								
General visual resource	Area Affected	73,780	All NL-No effect	480 NA; 21,970 NL; 51,330 NSO- No effect	480 NA; 73,300 NSO- No effect	Same as Alternative 3	16,840 NA; 56,940 NSO- No effect	960 NSO; 5,270 TL; 17,440 CSU; 50,110 ST- Outside of Scenic Byway, operations may be visible

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
RECREATION Developed campgrounds	Area of campgrounds affected	310	All NL-No effect	170 NL; 140 NSO- No effect	All NSO-No effect	Same as Alternative 3	All NA-No effect	Same as Alternative 3
	Area of ¼ mi buffer affected	1,910	All NL-No effect	750 NL; 1,160 NSO- No effect	490 NSO; 1,420 TL- Operations may be seen or heard during the off-season	310 NSO; 1,600 TL- Operations may be seen or heard during the off-season	All NA-No effect	370 NSO; 1,540 ST- Increased possibility of operations being seen or heard from the campground
Trails	Area of ¼ mi buffer affected	30,640	All NL-No effect	80 NA; 12,820 NL; 16,160 NSO; 80 TL; 1,500 CSU- No effect	80 NA; 27,830 NSO; 1,130 TL; 1,590 CSU; 10 ST- Little to no effect	80 NA; 25,100 NSO; 800 TL; 900 CSU; 3,760 ST- Operations may be seen or heard in some areas	12,570 NA; 1-1770 NL; 13,210 NSO; 840 TL; 2,250 ST- Operations may be seen or heard in some areas	1,810 NSO; 3,600 TL; 6,980 CSU; 18,250 ST- Operations likely to be seen or heard where they occur near trails
Recreation rivers	Area of ¼ mi buffer affected	9,100	All NL-No effect	6,560 NL; 2,540 NSO- No effect	7,590 NSO; 1,400 TL; 110 CSU- Little to no effect	4,260 NSO; 1,470 TL; 1,220 CSU; 2,150 ST- Operations may be seen or heard from some river segments	7,370 NA; 1,080 NSO; 320 TL; 190 TL/CSU; 130 ST- Little to no effect	1,150 NSO; 4,220 CSU; 3,730 ST- Operations may be seen or heard from some river segments
Red Lodge Ski Area	Area of permitted area affected	220	All NL-No effect	All NSO-No effect	Same as Alternative 2	10 NSO; 210 ST- Some operations may be seen or heard from the ski area	All NA-No effect	Same as Alternative 4
CULTURAL RESOURCES Archaeological, historical and cultural	Known and discovered sites affected	44 known sites	All NL-No effect	NL which would result in the application of measures adequate for protect of the sites	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
ROADLESS AND WILDERNESS Roadless areas	Area of unroaded character affected	83,910	All NL-No effect	Same as Alternative 1	100 NA; 71,220 NSO; 2,190 TL; 10 CSU; 2,530 ST- Potentially 6% of the area could be affected	100 NA; 71,220 NSO; 2,020 TL; 1,250 CSU; 9,320 ST- Potentially 15% of the area could be affected	38,070 NA; 3,000 NL; 31,370 NSO; 4,040 TL; 20 CSU; 3,610 TL/CSU; 3,800 ST- Potentially 14% of the area could be affected	2,630 NSO; 4,830 TL; 28,600 CSU; 47,850 ST- Potentially 97% of the area could be affected
QUALITY OF LIFE Municipal watershed-Red Lodge	Affects on water quality	18,090	All NL-No effect	Same as Alternative 1	All NSO-No effect	16,260 NSO; 1,800 CSU- Little to no effect	All NA-No effect	970 NSO; 17,090 CSU- Increased possible adverse effects
Air quality	Affects on air quality	RFD well locations occupied	All NL-No effects	No RFD sites occupied- No effects	2 RFD sites occupied- No cumulative effects	4 RFD sites occupied- Very minimal cumulative effects	Same as Alternative 3	Same as Alternative 4

Table of Contents

Page

- ***CHAPTER 1 PURPOSE AND NEED*** 1-1
- **1.1 PROPOSED ACTION** 1-1
  - Summary of Proposed Actions 1-1
  - Decisions to be Made - What The EIS Can and Cannot Do 1-1
  - Authority for the Decisions 1-2
- **1.2 PURPOSE AND NEED** 1-4
- **1.3 SCOPE OF THE PROPOSED ACTION** 1-5
  - Administrative Scope 1-5
  - Geographic Scope 1-5
  - Time Scope 1-5
- **1.4 REASONABLY FORESEEABLE DEVELOPMENT (RFD) SCENARIO** 1-6
- **1.5 FEDERAL MANAGEMENT OF LEASES AND ASSOCIATED DEVELOPMENT** 1-6
  - The Federal Leasing Process 1-6
  - Competitive and Noncompetitive Leases 1-6
  - Standard Lease Terms and Conditions, Stipulations 1-9
  - Bonding 1-9
  - Expiration or Temination of a Lease 1-9
  - Federal Management of Lease Activities 1-10
- ***CHAPTER 2 ALTERNATIVES*** 2-1
- **2.0 INTRODUCTION** 2-1
- **2.1 ALTERNATIVE DEVELOPMENT PROCESS** 2-1
  - 2.2.1 Scope of the EIS 2-1
  - 2.2.2 Environmental Issues 2-1
  - Changes to the Ecosystem Integrity 2-1
  - 1. Soils and Vegetation 2-1
  - 2. Fish and Wildlife Habitat 2-3
  - 3. Aesthetic Values 2-3
  - 4. Recreation 2-3
  - 5. Cultural Resources 2-3
  - 6. Roadless and Wilderness 2-4
  - 7. Quality of Life 2-4
  - 8. Economic Stability and Revenue 2-5
- **2.2 ALTERNATIVES DROPPED FROM FURTHER CONSIDERATION** 2-6
- **2.3 ALTERNATIVES CONSIDERED IN DETAIL** 2-7
  - Availability Alternatives 2-7
  - Alternative A 2-8
  - Alternative B 2-9
  - Alternative B1 2-9
  - Alternative C 2-9
  - Leasing Alternatives 2-10
  - Features Common Among All Alternatives 2-11
  - 1. Intermingled Ownership Patterns 2-11
  - 2. Mitigation on Existing Federal Leases 2-11
  - 3. Mitigation Available for New Leases 2-12
  - 4. Greater Yellowstone Area 2-12
  - 5. Areas Exempt From Further Study 2-12
  - 6. RFD 2-12

Page

- Alternative Descriptions . . . 2-13
- Alternative 1 . . . 2-16
- Alternative 2 . . . 2-17
- Alternative 3 . . . 2-17
- Alternative 4 . . . 2-17
- Alternative 4A . . . 2-17
- Alternative 5 . . . 2-17
- Summary of Alternatives . . . 2-18

CHAPTER 3 THE AFFECTED ENVIRONMENT . . . 3-1

3.0 INTRODUCTION . . . 3-1

3.0.1 OIL AND GAS RESOURCES . . . 3-1
- The Forest Plan Goal for Minerals Management . . . 3-1
- Historic Exploration, Production, and Leasing Trends . . . 3-1
- Current Leasing Status . . . 3-1
- Oil and Gas Occurrence Potential . . . 3-4
- Oil and Gas Development Potential . . . 3-4

3.1 EXISTING CONDITIONS BY ISSUE . . . 3-5
- Ecosystem Integrity - Biological Diversity . . . 3-5
- 3.1.1 Soils, Air, Water, and Vegetation (Issue 1) . . . 3-9
- 3.1.1.1 Soils Resources . . . 3-9
- 3.1.1.2 Air and Water Resources . . . 3-11
- 3.1.1.3 Vegetation Resources . . . 3-12
  - Vegetative Land Units and Cover Types . . . 3-13
  - Pre- and Post-Settlement Comparison . . . 3-16

3.1.2 Fish and Wildlife (Issue #2) . . . 3-17
- 3.1.2.1 Fish . . . 3-19
  - Geographic Setting and Historical Perspective . . . 3-19
  - Management Direction . . . 3-20
  - Affected Environment . . . 3-20
- 3.1.2.2 Threatened and Endangered Animal Species Species . . . 3-21
  - The Goal for the Management of Threatened and Endangered Animal Species . . . 3-21
  - Grizzly Bear . . . 3-21
  - Bald Eagle . . . 3-21
  - Gray Wolf . . . 3-22
  - Peregrine Falcon . . . 3-22
- 3.1.2.3 Sensitive Wildlife Species . . . 3-23
  - Townsend's Big-eared Bat, Spotted Bat, and Pallid Bat . . . 3-23
  - Harlequin Duck . . . 3-23
  - Lynx . . . 3-24
  - Black-backed Woodpecker . . . 3-24
  - Boreal Owl . . . 3-25
  - Ferruginous Hawk . . . 3-25
  - White-tailed Prairie Dog . . . 3-25
- 3.1.2.4 Important Habitats for Elk . . . 3-25
- 3.1.2.5 Important Habitat for Moose . . . 3-27
- 3.1.2.6 Important Habitat for Whitetailed and Mule Deer . . . 3-28
- 3.1.2.7 Important Habitat for Bighorn Sheep . . . 3-28
- 3.1.2.8 Important Habitat for Mountain Goat . . . 3-29
- 3.1.2.9 Important Habitat for Black Bear . . . 3-29
- 3.1.2.10 Important Habitat for Pronghorn . . . 3-30
- 3.1.2.11 Important Habitat for Mountain Lion . . . 3-30
- 3.1.2.12 Important Habitat for Management Indicator Species (MIS) and Other Species . . . 3-30
  - Management Indicator Species . . . 3-30
  - Other Species . . . 3-31

3.1.3 Natural Setting (Issue 3) . . . 3-32
  3.1.3.1 Visuals . . . 3-32
    The Goal of Visual Resource Management . . . 3-32
  3.1.3.2 Sound . . . 3-33
  3.1.3.3 Odor . . . 3-33

3.1.4 Recreation Resources (Issue 4) . . . 3-34
  The Goal of Recreation Management . . . 3-34

3.1.5 Cultural Resources (Issue 5) . . . 3-34
  The Goal of Cultural Resource Management . . . 3-34
  3.1.5.1 Prehistoric Sites . . . 3-36
  3.1.5.2 Historic Sites . . . 3-37
  3.1.5.3 Traditional Use and Traditional Cultural Sites . . . 3-38
  3.1.5.4 Cultural Resources Surveys and Results . . . 3-39

3.1.6 Roadless and Wilderness (Issue 6) . . . 3-40
  The Goal of Wilderness Management . . . 3-40
  3.1.6.1 Roadless Areas . . . 3-40
  3.1.6.2 Wilderness . . . 3-40

3.1.7 Quality of Life (Issue 7) . . . 3-40
  3.1.7.1 Transportation . . . 3-40
  3.1.7.2 Demographics . . . 3-41
  Carbon County . . . 3-41
  Stillwater County . . . 3-41
  Park County, Wyoming . . . 3-41
  3.1.7.3 Attitudes, Beliefs and Values . . . 3-41

3.1.8 Economics (Issue 8) . . . 3-42
  3.1.8.1 Economic Stability and Revenues . . . 3-42
    Mining . . . 3-44
    Recreation and Tourism . . . 3-44
    Other Industries . . . 3-45
    Trends in Labor Income . . . 3-45
    Labor Force . . . 3-46
    Personal Income . . . 3-46
    Housing . . . 3-47
  3.1.8.3 Fiscal Conditions . . . 3-47
    Property Tax Base . . . 3-47
    County Receipts . . . 3-48
  3.1.8.4 Community Services and Facilities . . . 3-48
    Carbon County . . . 3-48
    Stillwater County . . . 3-49
    Park County, Wyoming . . . 3-49

3.2 Existing Conditions by Management Area . . . 3-49
  3.2.1 Management Area B . . . 3-49
    The Goal for Management Area B . . . 3-49
    3.2.1.1 Management Area B: Bad Canyon . . . 3-51
    3.2.1.2 Management Area B: Little Rocky . . . 3-54
    3.2.1.3 Management Area B: Black Butte . . . 3-54
    3.2.1.4 Management Area B: Butcher Creek . . . 3-56
  3.2.2 Management Area C . . . 3-58

    The Goal for Management Area C . . . 3-59
    3.2.2.1 Management Area C: Meyers Creek . . . 3-59
    3.2.2.2 Management Area C: Picket Pin . . . 3-59
    3.2.2.3 Management Area C: Stillwater . . . 3-61
    3.2.2.4 Management Area C: Palisades . . . 3-61
    3.2.2.5 Management Area C: Line Creek . . . 3-63
    3.2.2.6 Management Area C: Cooke City . . . 3-65

3.2.3 Management Area D 3-67
The Goal For Management Area D 3-67
3.2.3.1 Management Area D: Picket Pin 3-68
3.2.3.2 Management Area D: Fishtail 3-70
3.2.3.3 Management Area D: Butcher Creek 3-72
3.2.3.4 Management Area D: Palisades 3-72
3.2.3.5 Management Area D: Line Creek 3-74

3.2.4 Management Area E 3-76
The Goal For Management Area E 3-76
3.2.4.1 Management Area E: Stillwater 3-77

3.2.5 Management Area F 3-80
The Goal For Management Area F 3-80
3.2.5.1 Management Area F: Woodbine 3-81
3.2.5.2 Management Area F: West Rosebud 3-81
3.2.5.3 Management Area F: East Rosebud 3-84
3.2.5.4 Management Area F: Grizzly Peak 3-84
3.2.5.5 Management Area F: Cascade 3-86
3.2.5.6 Management Area F: Basin 3-86
3.2.5.7 Management Area F: Palisades 3-86
3.2.5.8 Management Area F: Rock Creek 3-88

3.2.6 Management Area G 3-90
The Goal For Management Area G 3-90
3.2.6.1 Management Area G: Fishtail 3-90
3.2.6.2 Management Area G: Red Lodge 3-91

3.2.7 Management Area P 3-93
The Goal For Management Area P 3-93
3.2.7.1 Management Area P: Meyers Creek 3-93
3.2.7.2 Management Area P: Rock Creek 3-94

3.2.8 Management Area R 3-94
The Goal For Management Area R 3-94
3.2.8.1 Management Area R: West Fork Rock Creek 3-95

3.2.9 Management Area T 3-98
The Goal For Management Area T 3-98
3.2.9.1 Management Area T: Scenic Byway 3-99
3.2.9.2 Management Area T: Glacier Lake 3-102

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES 4-1
4.0 Introduction 4-1
Analysis Methodology 4-1
General and Site Specific Consequences 4-1
Mitigation 4-2
Monitoring 4-2
4.0.1 Common Conditions Affecting Impacts to All Resources 4-2
4.1 Effects Accross the Decision Area 4-4

4.1.1 Consequences to the Oil & Gas Resource 4-4
Effects Common to Alternatives 4-4
Effects of the Alternatives 4-5
Cumulative Effects 4-8
Probable Environmental Effects That Cannot Be Avoided 4-9
Relationship Between Short Term Use and Long Term Productivity 4-9
Irreversible and Irretrieable Commitments of Resources 4-9
Consistency With Forest Plan 4-9

4.1.2 Issue #1 Soils, Air, Water and Vegetation 4-9
4.1.2.1 Soils 4-9
4.1.2.2 Air 4-10
4.1.2.3 Water Resources 4-11
4.1.2.4 Riparian, Floodplains and Wetlands 4-13
4.1.2.5 Vegetation 4-13

Page

4.1.3 Issue #2 Fish and Wildlife 4-15
  4.1.3.1 Direct and Indirect Effects Common to All Alternatives 4-15
  4.1.3.2 Aquatic Resources and Fisheries 4-17
  4.1.3.3 Wildlife 4-21
    Species Eliminated From Further Analysis 4-21
    Species Analyzed at the Alternative Level 4-22
    Threatened and Endangered Species 4-22
    Sensitive Species 4-24
    Big Game Species 4-27
    Other Wildlife Species 4-28

4.1.4 Ecosystem Integrity - Biodiversity 4-34
4.1.5 Issue #3 Aesthetics 4-35
4.1.6 Issue #4 Recreation 4-35
4.1.7 Issue #5 Cultural Resources 4-37
4.1.8 Issue #6 Roadless 4-40
4.1.9 Issue #7 Quality of Life 4-41
4.1.10 Issue #8 Economic Stability and Revenue 4-44

4.2.0 Effects By Management Area 4-51
  4.2.1 B Management Areas: 4-51
    4.2.1.1 Management Area B: Bad Canyon 4-53
    4.2.1.2 Management Area B : Little Rocky 4-55
    4.2.1.3 Management Area B : Black Butte 4-58
    4.2.1.4 Management Area B : Butcher Creek 4-61

  4.2.2 C Management Areas: 4-65
    4.2.2.1 Management Area C : Meyers Creek 4-66
    4.2.2.2 Management Area C : Picket Pin 4-66
    4.2.2.3 Management Area C : Stillwater 4-67
    4.2.2.4 Management Area C : Palisades 4-68
    4.2.2.5 Management Area C : Line Creek 4-69
    4.2.2.6 Management Area C : Cooke City 4-72

  4.2.3 D Management Areas: 4-74
    4.2.3.1 Management Area D: Picket Pin 4-75
    4.2.3.2 Management Area D : Fishtail 4-77
    4.2.3.3 Management Area D : Butcher Creek 4-81
    4.2.3.4 Management Area D : Palisades 4-82
    4.2.3.5 Management Area D : Line Creek 4-83

  4.2.4 E Management Areas: 4-87
    4.2.4.1 Management Area E: Stillwater 4-88

  4.2.5 F Management Areas: 4-93
    4.2.5.1 Management Area F: Woodbine 4-94
    4.2.5.2 Management Area F : West Rosebud 4-96
    4.2.5.3 Management Area F : East Rosebud 4-98
    4.2.5.4 Management Area F : Grizzly Peak 4-101
    4.2.5.5 Management Area F : Cascade 4-102
    4.2.5.6 Management Area F : Basin 4-103
    4.2.5.7 Management Area F : Palisades 4-103
    4.2.5.8 Management Area F: Rock Creek 4-104

  4.2.6 G Management Areas: 4-108
    4.2.6.1 Management Area G : Fishtail 4-109
    4.2.6.2 Management Area G : Red Lodge 4-111

  4.2.7 P Management Areas: 4-113
    4.2.7.1 Management Area P : Meyers Creek 4-113
    4.2.7.2 Management Area P : Rock Creek 4-114

  4.2.8 R Management Areas: 4-114
    4.2.8.1 Management Area R: West Fork Rock Creek 4-115

  4.2.9 T Management Areas: 4-120
    4.2.9.1 Management Area T : Scenic Byway 4-121
    4.2.9.2 Management Area T : Glacier Lake 4-126

CHAPTER 5 PUBLIC INVOLVEMENT SUMMARY 5-1

CHAPTER 6 LIST OF PREPARERS 6-1

GLOSSARY

APPENDICES

Appendix A : Oil and Gas Potential and Reasonably Foreseeable Development Scenario A-1
Appendix B : Hypothetical Well Site Locations and Production Assumptions Used In The Environmental Effects Analysis B-1
Appendix C : Oil and Gas Exploration, Development and Production C-1
Appendix D : Condition of Approval (COA's) D-1
Appendix E : Standard Term BLM Form 3100-11, Descriptions Of Lease Notices, Lease Stipulations And Conditions For A Waiver, Exception, Or Modification E-1
Appendix F : Analysis Methodologies F-1
Appendix G : Maps G-1

LIST OF TABLES

Table 2.1 : Lands Administratively Available By Management Area And Alternative . . . 2-8
Table 2.2 : Summary of Acres by Availability Alternatives . . . 2-10
Table 2.3 : Management Areas in Beartooth Decision Area . . . 2-10
Table 2.4 : Stipulation by Management Area, Resource, and Alternative . . . 2-13
Table 2.5 : Summary of Stipulation Acreage by Leasing Alternative . . . 2-18
Table 2.6 : RFD Well Locations by Alternative . . . 2-20
Table 2.7 : Comparison Summary of Issues by Alternative . . . 2-21
Table 3.1 : Beartooth Ranger District Oil and Gas Leasing History . . . 3-4
Table 3.2 : Location of Historical Leasing on the Beartooth Ranger District . . . 3-4
Table 3.3 : Fragile/High Hazard Landtypes . . . 3-11
Table 3.4 : Estimated Annual Streamflow Through the Project Area . . . 3-12
Table 3.5 : Vegetation Cover Types . . . 3-14
Table 3.6 : Forest Service Region One Sensitive Species And State Special Concern Species . . . 3-16
Table 3.7 : Forest Conditions . . . 3-17
Table 3.8 : Decision and Anaysis Area Statistics . . . 3-18
Table 3.9 : Visual Quality Objectives For Example Areas . . . 3-33
Table 3.10 : National Register of Historic Places Site Status . . . 3-35
Table 3.11 : Summary of Rare II Areas . . . 3-40
Table 3.12 : Affected Area Population Statistics . . . 3-41
Table 3.13 : 1989 Labor Income by Major Industry . . . 3-43
Table 3.14 : Average Annual Covered Employment - 1989 . . . 3-43
Table 3.15 : Farm Statistics - 1982 and 1987 . . . 3-43
Table 3.16 : 1990 Oil and Gas Production . . . 3-44
Table 3.17 : 1990 Labor Force Statistics and Unemployment Rates . . . 3-46
Table 3.18 : 1989 Personal Income By Major Component . . . 3-46
Table 3.19 : Vacancy Rates . . . 3-47
Table 3.20 : Fiscal Year 1991 Payments to Counties From National Forest Receipts . . . 3-48
Table 3.21 : Management Area B Resource/Issue Information . . . 3-50
Table 3.22 : Management Area C Resource/Issue Information . . . 3-58
Table 3.23 : Management Area D Resource/Issue Information . . . 3-67
Table 3.24 : Management Area E Resource/Issue Information . . . 3-76
Table 3.25 : Management Area F Resource/Issue Information . . . 3-80
Table 3.26 : Management Area G Resource/Issue Information . . . 3-90
Table 3.27 : Management Area P Resource/Issue Information . . . 3-93
Table 3.28 : Management Area R Resource/Issue Information . . . 3-94
Table 3.29 : Management Area T Resource/Issue Information . . . 3-98
Table 4.1 : Acres by Stipulation by Alternative . . . 4-3
Table 4.2 : Well Sites Constrained By Alternative . . . 4-5
Table 4.3 : Percent Acres of Occurrence Potential Constrained by Alternative . . . 4-5
Table 4.4 : Percent of Development Potential Constrained by Alternative . . . 4-6
Table 4.5 : Issue 1, Acres by Stipulation by Alternative . . . 4-15
Table 4.6 : Issue 2, Acres by Stipulation by Alternative . . . 4-29
Table 4.7 : Issue 3 & 4, Acres by Stipulation by Alternative . . . 4-36
Table 4.8 : Issue 5, Cultural Site Density by Stipulation and Alternative . . . 4-39
Table 4.9 : Issue 6, Acres by Stipulation by Alternative . . . 4-41
Table 4.10 : Fiscal Impacts by Alternative . . . 4-45
Table 4.11 : Employment and Income Impacts by Alternative . . . 4-46
Table 4.12: Resource Acres by Alternative and Stipulation (B Mgmt. Areas) . . . 4-51
Table 4.13 : Resource Acres by Alternative and Stipulation (C Mgmt. Areas) . . . 4-65
Table 4.14 : Resource Acres by Alternative and Stipulation (D Mgmt. Areas) . . . 4-74
Table 4.15 : Resource Acres by Alternative and Stipulation (E Mgmt. Areas) . . . 4-87
Table 4.16 : Resource Acres by Alternative and Stipulation (F Mgmt. Areas) . . . 4-93
Table 4.17 : Resource Acres by Alternative and Stipulation (G Mgmt. Areas) . . . 4-108
Table 4.18 : Resource Acres by Alternative and Stipulation (P Mgmt. Areas) . . . 4-113
Table 4.19 : Resource Acres by Alternative and Stipulation (R Mgmt. Areas) . . . 4-114
Table 4.20 : Resource Acres by Alternative and Stipulation (T Mgmt. Areas) . . . 4-120
Table A.1 : Producing Oil And Gas Fields . . . A-5

Table A.2 : Inactive Montana Oil And Gas Fields A-7
Table B.1 : Summary of Well Site and Production Assumptions B-7
Table B.2 : US Forest Service Estimated Road And Well Pad Disturbance B-15
Table E-LN1 : Summary of Lease Notice For Sensitive Plants E-4
Table E-LN2 : Summary of Lease Notice For Sensitive Plant Sites E-4
Table E-LN3 : Summary of Lease Notice For Grizzly Bear E-4
Table E-LN4 : Summary of Lease Notice For Yellowstone Cutthroat Trout E-5
Table E-LN5 : Summary of Lease Notice For Bald Eagle Habitat E-5
Table E-LN6 : Summary of Lease Notice For Peregrine Falcon Habitat E-5
Table E-S1 : Summary of Stipulations For Soils E-10
Table E-S2 : Summary of Stipulations For Sensitive Plant Sites E-11
Table E-S3 : Summary of Stipulations For Grizzly Bear E-11
Table E-S4 : Summary of Stipulations For Eagles E-13
Table E-S5 : Summary of Stipulations For Prairie Falcons E-14
Table E-S6 : Summary of Stipulations For Elk E-15
Table E-S7 : Summary of Stipulations For Bighorn Sheep E-18
Table E-S8 : Summary of Stipulations For Mule Deer E-19
Table E-S9 : Summary of Stipulations For Moose E-20
Table E-S10 : Summary of Stipulations For Mountain Goat E-22
Table E-S11 : Summary of Stipulations For Yellowstone Cutthroat Trout E-23
Table E-S12 : Summary of Stipulations For Management Area C E-24
Table E-S13 : Summary of Stipulations For Riparian E-25
Table E-S14 : Summary of Stipulations For Municipal Watershed E-25
Table E-S15 : Summary of Stipulations For Aesthetics E-27
Table E-S16 : Summary of Stipulations For Recreation E-30
Table E-S17 : Summary of Stipulations For Cultural E-33
Table E-S18 : Summary of Stipulations For Roadless Areas E-36
Table E-S19 : Summary of Stipulations For Recreation Rivers E-37
Table E-S20 : Summary of Stipulations For Recreation Residences and Camps E-38
Table E-S21 : Summary of Stipulations For Facilities E-39

LISTS OF FIGURES

Figure 1.1 : Schematic Representation of the Leasing Process . . . 1-8
Figure 1.2 : Summary of Post Lease Activities & Decision Points . . . 1-11
Figure 2.1 : Graphic Comparison of Alternatives . . . 2-19
Figure A.1 : Stratigraphic Column . . . A-2
Figure A.2 : Diagrammatic Section Through AMOCO No. 1 Beartooth Unit . . . A-12
Figure C.1 : Sequence Of Operations In An Oil And Gas Field . . . C-2
Figure C.2 : Wellsite Location Layout . . . C-9
Figure C.3 : Blow Out Preventer, Three Preventer Stack . . . C-10
Figure C.4 : Directional Drilling; Horizontal Oil Well Drilling . . . C-13
Figure C.5 : Wellhead . . . C-23
Figure C.6 : Sucker Rod Pump Unit . . . C-24
Figure C.7 : Cutaway View Of Vertical Heater-treater . . . C-27
Figure C.8 : Cutaway Of Horizontal Seperator . . . C-28

LISTS OF MAPS

Page

3.1 : Major Oil Potential Areas in Western US 3-2
3.2 : Current Areas Under Lease 3-3
3.3 : National Forest & Parks in the Greater Yellowstone Area 3-7
3.4 : Management Area B Bad Canyon 3-53
3.5 : Management Area B Little Rocky 3-55
3.6 : Management Area B Black Butte 3-55
3.7 : Management Area B Butcher Creek 3-57
3.8 : Management Area C Meyers Creek 3-60
3.9 : Management Area C Picket Pin 3-60
3.10 : Management Area C Stillwater 3-62
3.11 : Management Area C Palisades 3-62
3.12 : Management Area C Line Creek 3-64
3.13 : Management Area C Cooke City 3-66
3.14 : Management Area D Picket Pin 3-69
3.15 : Management Area D Fishtail 3-71
3.16 : Management Area D Butcher Creek 3-73
3.17 : Management Area D Palisades 3-73
3.18 : Management Area D Line Creek 3-75
3.19 : Management Area E Stillwater 3-79
3.20 : Management Area F Woodbine 3-83
3.21 : Management Area F West Rosebud 3-83
3.22 : Management Area F East Rosebud 3-85
3.23 : Management Area F Gizzly Peak 3-85
3.24 : Management Area F Cascade 3-87
3.25 : Management Area F Basin 3-87
3.26 : Management Area F Palisades 3-87
3.27 : Management Area F Rock Creek 3-89
3.28 : Management Area G Fishtail 3-92
3.29 : Management Area G Red Lodge Creek 3-92
3.30 : Management Area P Meyers Creek 3-97
3.31 : Management Area P Rock Creek 3-97
3.32 : Management Area R West Fork of Rock Creek 3-97
3.33 : Management Area T Scenic Byway 3-101
3.34 : Management Area T Glacier Lake 3-103
Map 1A : Vicinity Map 1-3
Map A.1: Generalized Structure Map A-3
Map A.2: Oil And Gas Occurrence Potential A-8
Map A.3: Oil And Gas Development Potential A-10
Map B.1: Hypothetical Well Sites B-2

Appendix G : Maps

Map 1	High Hazard and Fragile Soils Sensitive Plants Habitat Sensitive Plant Sites
Map 2	Roadless Areas Slopes >40%
Map 3	Eagles Grizzly Bear Yellowstone Cutthroat Trout
Map 4	Elk
Map 5	Mule Deer Moose
Map 6	Campgrounds Trails Recreation Rivers Vista Point Recreation Residents Recreation Opportunity Spectrum (ROS)
Map 7	Mountain Goat Bighorn Sheep

LIST OF ACRONYMS USED IN THIS DOCUMENT

ACC	Areas of Critical Concern
ACEC	Areas of Critical Environmental Concern
AIRFA	American Indian Religious Freedom Act
APD	Application for Permit to Drill
AQB	Air Quality Bureau
ARPA	Archaeological Resources Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practices
BOP	Blowout Preventer Valves
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulation
CNF	Custer National Forest
CNFMPS	Custer National Forest Management Plan Standards
COA	Conditions of Approval
CSU	Controlled Surface Use
CWA	Clean Water Act
DSL	Department of State Lands
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAN	Final Advancement Notice
FEIS	Final Environmental Impact Statement
FLPMA	Forest Land Plan and Management Act
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act of 1987
FP	Forest Plan
FS	Forest Service
GIS	Geographic Information System
GYA	Greater Yellowstone Area
LGST	Local Government Severance Tax
LN	Lease Notice
MA	Management Area
MCF	One Thousand Cubic Feet - Units of Gas
MDFWP	Montana Department of Fish, Wildlife, and Parks
MGS	Montana Geological Society
MIS	Management Indicator Species
MS 1	Management Situation 1
MS 2	Management Situation 2
MSO	Montana State Office (of BLM)
NA	Not Available
NAAQS	National Ambient Air QUality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NIA	Notice of Intent to Abandon
NL	Not Leased
NOS	Notice of Staking
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NTL	Notice to Lessee
OPI	Office of Public Instruction
ORV	Off Road Vehicle
RARE II	Roadless Area Review and Evaluation II
RD	Ranger District
RFD	Reasonably Foreseeable Development
RMP	Resource Management Plan
ROD	Record of Decision
RPA	Resource Protection Act
RVD	Recreation Visitor Day
SMA	Surface Management Agency
SRA	Subsequent Report of Abandonment
ST	Standard Terms
TES	Threatened and Endangered Species
TL	Timing Limitations
UIC	Underground Injection Control
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VQO	Visual Quality Objective
WEM	Waiver, Exception or Modification
X-C	Cross Country
YGBE	Yellowstone Grizzly Bear Ecosystem

SUMMARY OF CHANGES BETWEEN DRAFT AND FINAL EIS

General: A draft of this environmental impact statement was released for public review and comment in September, 1992. The draft EIS contained alternatives designed to respond to the major issues identified during the scoping process. Many changes were incorporated into this final EIS as a result of agency and public comments received on the draft EIS. However, no new issues were identified. Two new alternatives, identified in this analysis as Alternatives B1 and 4A, are added in the final EIS in response to public comments.

The final EIS, like the draft EIS, addresses both direct, indirect, and cumulative effects that may be anticipated from leasing and reasonably foreseeable development.

Chapter 1: Changes in chapter 1 include an expansion of the discussion of Purpose and Need to respond to public questions regarding why we are doing a leasing analysis on the Beartooth Ranger District in the first place, and why at this particular time. Some of the discussions within specific sections have been reorganized for clarity. Other changes are primarily editorial, such as correcting labelling errors on figures.

Chapter 2: In this chapter, we clarified why we are using two sets of alternatives and what the decision relative to each set will be. We added a new availability alternative, B1, and a new leasing alternative, 4A, which we developed in response to public comments received on the draft EIS. This chapter also contains responses to public comments on why certain subissues were not carried through the analysis (such as acid rain, and leasing all lands with Standard Terms) and why some specific issues were not considered in the draft EIS.

The descriptions of all alternatives have been more fully described, and organized to make comparison of alternative points easier. A table which was originally included in the draft EIS showing the results of "stacked stipulations" by alternative has been omitted in the final EIS, since it is not relevant to the topics discussed in chapter 2. Two new tables have been added: Table 2.6 shows RFD well locations by alternative and table 2.7 is a comparison summary of issues by alternative. Also, Table 2.4 showing details of alternative stipulations has been added for ease of comparison.

Chapter 3: In general, the changes made in response to public comments include an expansion of discussion of resources such as fisheries and wildlife. Changes in the cultural resources section includes a discussion of cultural surveys and a predictive model used for this study. In response to many suggestions that additional maps in this chapter would be desirable, we added a number of maps: a map showing the relationship of the Big Horn Basin to other oil and gas basins in the western United States; a map showing the areas on the Beartooth District currently under lease, and a map of the Greater Yellowstone Area. We moved the Resource maps from Chapter 4 to Chapter 3 and added additional resource information to the maps. We also added more basic cultural features to make the maps more understandable. Then we reduced the overall number of maps by combining wherever possible to reduce bulk and to give a greater sense of context.

We reorganized some sections to make them more readable (for instance, "Oil and Gas Resources" and "Ecosystem Integrity/Biological Diversity"). Finally, we added a discussion of the transportation situation under Issue 7, Quality of Life.

Chapter 4: In general, the changes to this chapter include an expansion of the discussion of impacts to resources, such as fisheries, wildlife, cultural resources, as well as expanding the discussion of effects to socio-economic conditions. We added a description of effects to all resources relative to alternative 4A. We reorganized portions of the chapter, for instance moving the discussion of effects to air and water from Issue #7, Quality of Life, to Issue #1 (section 4.1.2) except where discussion was addressed to human health under Issue #7. We added a discussion of effects of the various alternatives to the oil and gas resource (section 4.1.1).

Finally, where the draft EIS included acreages compiled from both rastor and polygon GIS procedures, the final EIS displays acreages derived only through the rastor method. This provides consistency in how acreages are counted throughout the analysis.

Chapter 5: The summary of the scoping comments from the draft EIS has been condensed for the final EIS, and the chapter now contains a summary of public comments received on the draft EIS. Responses are available in the project record. Responses to comments from local, state, and Federal agencies and elected officials are included in a separate appendix.

Appendix E: We separated the discussion of peregrine falcons from eagles.

Appendix G: Maps in the final EIS are combined to show alternatives with resources and stipulations indicated. All details of the various alternative features are displayed side by side and in color for ease of comparison.

CHAPTER 1

Purpose and Need

CHAPTER 1

1.1 PROPOSED ACTION

Introduction

The Beartooth Mountain Range is on the eastern edge of the Northern Rocky Mountain province. A major oil-and-gas producing sedimentary basin, the Bighorn Basin extends beneath the Beartooth range for at least several miles. Oil and gas exploration and development has taken place in the Bighorn Basin since the 1920s. The first producing oil well in Montana was drilled n the Bighorn Basin in Carbon County in 1915, and there were 47 exploratory wells drilled in the area between 1950 and 1990. Six exploratory wells were drilled in the decision area during this time period. There are currently about 60 producing oil wells and 40 producing gas wells in Carbon County in the vicinity of the decision area.

Summary of Proposed Actions

The Forest Service (FS) proposes to authorize the Bureau of Land Management (BLM) to lease certain National Forest System lands for oil and gas exploration and possible development. These lands being considered for leasing are referred to in this analysis as the "decision" area. The "decision" area consists of 177,960 acres and is part of a larger area referred to as the "analysis" area. The decision and analyses areas are within the administrative boundaries of the Beartooth Ranger District, Custer National Forest. Decisions regarding lands identified for leasing will be consistent with the Custer National Forest Land Management Plan, (Forest Plan), approved June 10, 1987 as amended. The Environmental Impact Statement (EIS) decision area is identified on Map 1A. It includes all of the lands in the Beartooth Mountains outside of the Absaroka-Beartooth Wilderness Area. Release of the Record of Decision is planned for within 30 to 60 days after the final Environmental Impact Statement (FEIS) is released to the public.

The FS proposes the following specific actions:

- To comply with the requirements of 36 CFR 228, 1990, the FS will reconsider the Forest Plan decision by displaying which National Forest System lands within the boundary of the Beartooth Ranger District are "administratively available" for oil and gas leasing.

- For lands determined to be "administratively available", the FS will identify specific lease stipulations applicable to those lands, including those lands that restrict all surface occupancy with No Surface Occupancy (NSO) stipulations.

- Within the lands determined to be "administratively available", the FS proposes to authorize the BLM to offer specific National Forest System lands for leasing, as well as identify lands that, even though "administratively available", may not be offered for lease at this time.

- The FS may amend the Forest Plan to include site specific changes as indicated in the analysis.

The BLM will apply environmental and cultural protection requirements applicable on FS administratively available lands to leases it issues on split estate minerals within the leasing area.

Alternatives to the proposed actions are described in detail in Chapter 2 and are analyzed in Chapter 4.

Decisions to be Made - What The EIS Can and Cannot Do

The two decisions to be made based on the analysis disclosed in this EIS will determine future actions regarding Federal oil and gas leasing in the Beartooth Mountains portion of the Beartooth Ranger District.

The first decision is whether lands are "available" or "not available" to lease. The Forest Plan determined availability. This EIS revisits that decision to assess if changes in availability should be considered. Specific areas are discussed and displayed as required by the 36 CFR 228 regulations implementing the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA).

The second decision is to address what lands, if any, should be authorized for lease, and if leased, what would be the appropriate surface resource mitigation to apply. A determination is made as to whether the leases will use BLM standard lease terms, or if specific mitigation measures called stipulations will be made a part of the lease. (See Appendix E).

Public comments received on the draft EIS released October 1992 have been incorporated. The decisions to be made are limited by the legal authority of the FS and the BLM. These limits determine what the final decisions **CAN** and **CANNOT** do for several major factors.

The decisions **CAN** determine the management of activities related to development of oil and gas resources on Federal lands. They **CANNOT** dictate the management on lands with split surface and mineral estates, that is, where both the surface and mineral estates are owned by private, state and/or local government entities. The area considered in this analysis is mainly Federal with scattered private ownership. There are some lands in other ownership, mostly in drainage bottoms and near the periphery of the area.

The decisions **CAN** control and/or limit oil and gas development on currently unleased Federal lands. They **CANNOT** control or limit all oil and gas development in the decision area on lands in nonfederal ownership. New requirements **CANNOT** be imposed on the contractual terms of the existing leases, nor can existing leases be revoked if a decision is made not to lease. Although many operators are willing to voluntarily make changes, decisions made as a result of this analysis cannot require them to do so. Consequently, some oil and gas operations could continue in the decision area even if the Federal government were to never issue another lease.

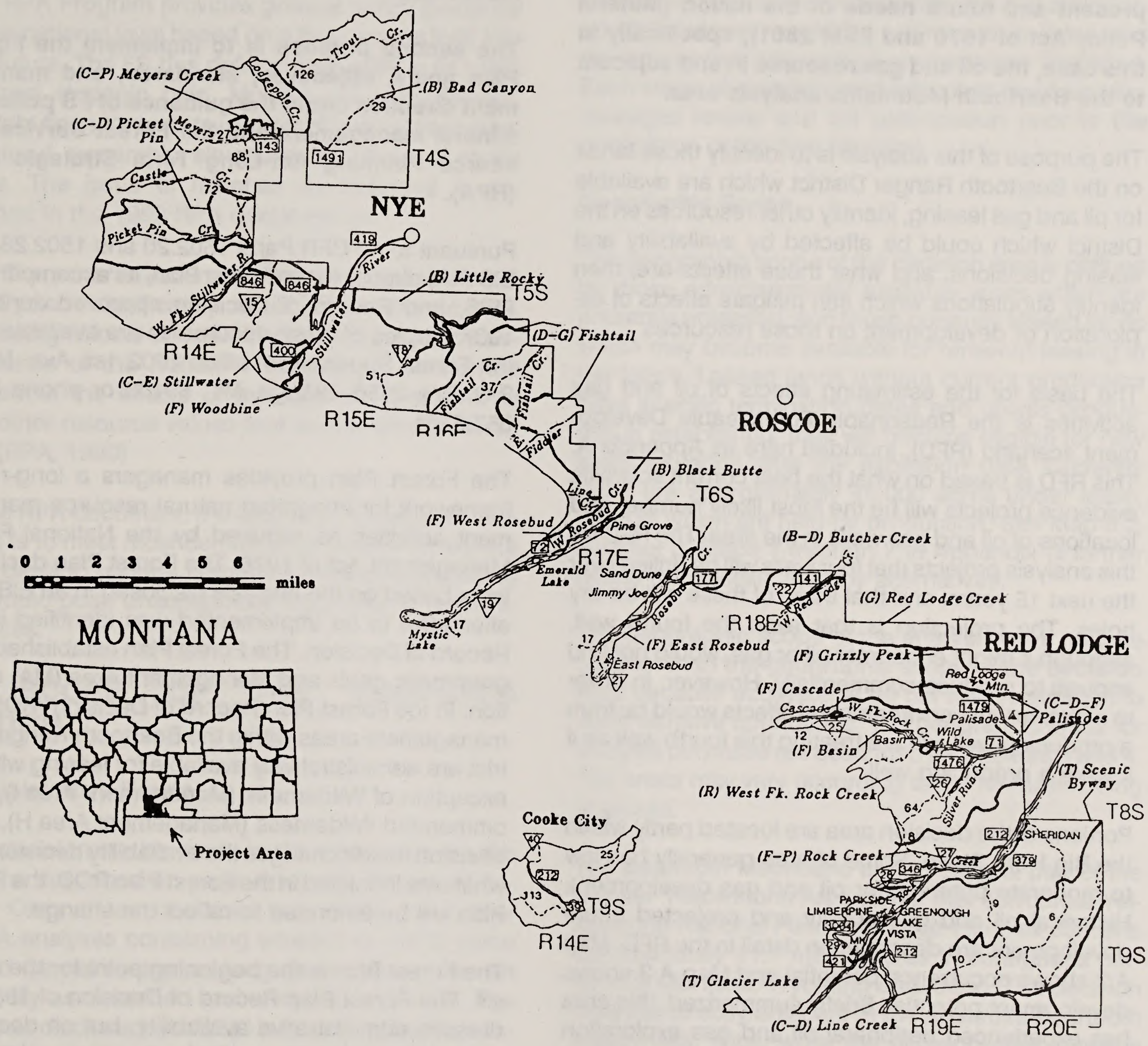
The decision **CAN** provide surface resource protection on Federal lands. It **CANNOT** preclude extraction of Federal or nonfederal oil and gas deposits along the boundaries of private lands where the possibility of drainage by a well on private land exists. Regardless of any decision made in this document, oil and gas operators will still be able to access nonfederal deposits. In doing so, they may drain Federal deposits. However, since there are only minor amounts of private lands within the decision area, this possibility is remote and extensive development is not anticipated.

Authority for the Decisions

The authority to issue all leases for the exploration and production of Federally owned oil and gas resides with the BLM. Prior to Federal Onshore Oil and Gas Leasing Reform Act of 1987, FS authority on oil and gas leases issued on National Forest System lands was varied, and in some cases Forest Plan decisions were nonbinding on the BLM. Under the new regulations, FS decisions to lease with certain stipulations are binding on the BLM for all Federal minerals on National Forest System lands.

The authority to make the decisions described in the proposed actions is conferred by the Mineral Leasing Act of 1920, as amended, which includes the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The implementing regulations are found at 36 CFR 228 (E), and authority to implement has been delegated to the Custer National Forest Supervisor. These regulations administer oil and gas activities on National Forest System lands. Implicit in this delegation are the authorities of all previous laws and regulations that govern the management of National Forest System lands such as, but not limited to: The Organic Act of June 4, 1897; General Mining Law of 1872; Energy Security Act of June 30, 1980; Multiple-Use Sustained-Yield Act of 1960; National Forest Management Act of 1976 (NFMA) and its implementing regulations (36 CFR Part 219); and the National Environmental Policy Act (NEPA) and its implementing regulations (40 CFR Part 1500), and the 1992 Energy Act.

Vicinity Map 1A



1.2 PURPOSE AND NEED

The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of domestic mineral and energy resources on NFS lands to help meet the present and future needs of the nation (Mineral Policy Act of 1970 and FSM 2801), specifically in this case, the oil and gas resource in and adjacent to the Beartooth Mountains analysis area.

The purpose of this analysis is to identify those lands on the Beartooth Ranger District which are available for oil and gas leasing, identify other resources on the District which could be affected by availability and leasing decisions, and what those effects are, then identify stipulations which can mitigate effects of exploration or development on those resources.

The basis for the estimating effects of oil and gas activities is the Reasonably Foreseeable Development scenario (RFD), included here as Appendix A. This RFD is based on what the best current scientific evidence projects will be the most likely number and locations of oil and gas wells in the area. The RFD for this analysis projects that four wells will be drilled over the next 15 years, and that three of these will be dry holes. The projection is that even the fourth well, although it might encounter oil or gas, would not find enough to produce commercially. However, in order to estimate what environmental effects would be from a producing well, we are treating this fourth well as if it were a producing well.

Portions of the decision area are located partly within the Big Horn Basin. Some of area generally has low to moderate potential for oil and gas development. Historical oil and gas activity and projected future development are described in detail in the RFD. Map A.2 shows occurrence potential and Map A.3 shows development potential. Briefly summarized, this area has experienced peripheral oil and gas exploration since the late 1880s. Recently, two wells were drilled within the decision area. Neither showed economic quantities of oil or gas and both have been plugged and abandoned. About 46,000 acres are currently leased within the area, and industry has expressed continuing interest in leasing specific lands. Information on existing leases is available at the Beartooth Ranger District and at the Custer NF Supervisor's Office.

Regulations found at 36 CFR 228 (E) were issued on April 20, 1990, to implement the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and other applicable mineral leasing and environmental protection statutes. The process delineated in the new regulations differs from previous procedures for oil and gas leasing in several ways, but one of the most striking differences is the requirement for area wide analysis rather than environmental analyses on a lease-by-lease basis.

The second purpose is to implement the Forest Plan goals, objectives, standards, and management direction under the guidance of FS policy on mineral management and the Forest Service Resource Planning Act-Long Term Strategic Plan (RPA).

Pursuant to 40 CFR Parts 1502.20 and 1502.28, this EIS tiers directly to the Forest Plan, its accompanying FEIS, and Record of Decision approved June 10, 1987. Copies of these documents are available from the Forest Supervisors' office 2602 1st. Ave. North, P.O. Box 2556, Billings, MT, 59103 or phone (406) 657-6361.

The Forest Plan provides managers a long-range framework for integrated natural resource management activities as required by the National Forest Management Act of 1976. The Forest Plan decisions were based on the analysis disclosed in an EIS. The alternative to be implemented was identified in the Record of Decision. The Forest Plan established programmatic goals and Management Area (MA) direction. In the Forest Plan Record of Decision (ROD), all management areas within the Beartooth Ranger District are administratively available for leasing with the exception of Wilderness (Management Area I), Recommended Wilderness (Management Area H). If the decision maker changes the availability decision from what was identified in the Forest Plan ROD, the Forest Plan will be amended to reflect the change.

The Forest Plan is the beginning point for the analysis. The Forest Plan Record of Decision of 1987 addresses administrative availability, but no decisions regarding leasing of specific lands were made. Since 1987, leasing decisions have been made on a lease-by-lease basis using Forest Plan standards and guidelines. Priorities for lease authorization have been based upon BLM and industry requests. This EIS expands upon the Forest Plan by considering additional alternatives, and discloses in a more site-specific manner the effects of oil and gas leasing within the decision area. The specific areas of available lands, lands not available, and the stipulations applicable to the areas are mapped and either displayed in this EIS or are available in the analysis record at the Forest Supervisor's office. Chapter 3 contains additional information on Forest Plan Management Direction pertinent to the analysis. The current analysis will form a bridge between the Forest Plan and the CFR 228 regulations, and new information may be incorporated to amend the Forest Plan.

The RPA Program provides general policy guidance at the national level based on a five-decade look into the future. The FS has defined nine roles in its basic national strategic plan. Multiple-use management, contributions to rural development and management in mixed ownership situations are three of those roles. The issue of minerals development is described in the 1990 RPA document as:

> "The mineral resources within the National Forest System significantly affect the economic well-being of local communities and the strategic defense of the Nation. The public is concerned about the effects of minerals development on other resource values and on the environment." (RPA, 1990)

In the RPA document, the long term strategy for minerals is to meet most demands for access to explore and develop mineral resources, except when doing so would pose unacceptable high risks to other resources.

1.3 SCOPE OF THE PROPOSED ACTION

Administrative Scope

The decisions to be made in this document are the actions described on page 1-1 under Proposed Action. Once these decisions are made, no further NEPA analyses concerning whether or not to lease would be necessary as long as conditions remain basically as described and analyzed in the EIS. The analysis disclosed in this EIS is based on the Reasonably Foreseeable Development Scenario (RFD). This scenario anticipates, given what is currently known about the geology of the area, that the most reasonable expectation is that four exploratory oil and gas wells may be drilled in the decision area in the next 15 years (Appendices A and B).

Because the best scientific knowledge and projections anticipates a maximum of only four wells, this is not an analysis of a worst case scenario of unlimited oil and gas activity or speculation upon full field development. If there are changes in development beyond what is described in the RFD, these will be evaluated as they occur.

Any exploration and development, including wells hypothesized in the RFD, would initiate additional and site-specific NEPA analysis at the Application for Permit to Drill (APD) stage when a specific site location is chosen. At that time the specific site and anticipated disturbances would be addressed in detail and the appropriate site mitigation measures identified. Each stage of decision involves public input and encourages review and full participation prior to the publication of the final decision.

Geographic Scope

The geographic scope of the decision area is defined by those administratively available areas which are presently unleased, and those currently leased lands which may become available for renewed leasing in the future. Leased lands without current production have specific termination dates and unless production is established, they will become eligible for new lease issuance after the expiration date. Currently there are approximately 46,000 acres under lease, none of which are held by production. See Map 3.2, Chapter 3. Maps 1 through 7 in Appendix G further define the specific area by alternatives.

The geographic scope of the **analysis area** may be broader than the geographic scope of the **decision area** because ecosystems do not always conform to administrative boundaries. The geographic areas for analysis purposes are described in Chapters 3 and 4. The areas may vary according to the resource being analyzed.

The Beartooth Mountains are an integral part of the Greater Yellowstone Area (GYA) that surrounds Yellowstone National Park. This large complex contains approximately 11.7 million acres in contiguous portions of Montana, Wyoming and Idaho. The decision area lies directly adjacent to the Absaroka-Beartooth Wilderness. Thus, while the decision area contains 177,100 acres, it also is part of a larger complex that encompasses some of the nations' most important habitats and scenic beauty. The significance of this relationship is reflected in the public comments to scoping and is incorporated into the analysis.

Time Scope

The time period used for this analysis is 15 years. This period was chosen to allow a reasonable estimate of effects. The life of a lease, assuming no production, can be up to ten years. The actual issuance of a lease following a decision to lease may not occur for several years. Thus it would appear reasonable to cover the range of time from a decision to lease until a lease may expire. If in fact a lease develops a producing well it is recognized that some effects would continue beyond the 15 year period until production ceases and reclamation is complete. For a full discussion of the stages of operations see Appendix C.

Given the current rate of change in law and regulation as well as the continuing collection of new data we further recognize that the actual life of a decision could be very short. On the other hand, if no such events occur it is possible that the decision life could extend well beyond 15 years. One factor that would influence the life of the decision is the scheduled review of the Forest Plan on a five year basis. The scheduled 1993 Custer Forest Plan review could provide a basis for almost immediate modification of the decision. The close coordination of all phases of this analysis with the Forest Plan make this possibility remote at this time.

The analysis conducted for this EIS is consistent with the direction of the Forest Plan unless noted. Where the analysis may indicate that new data, change of policy, or legal requirement changes are not consistent with the Forest Plan, the Forest Supervisor may amend the Forest Plan. These amendments, while under a different process, will be made at the time the Record of Decision is published for this EIS. Chapters 2, 3, and 4 identify specific items that, if included in the ROD, would require amendment of the Forest Plan.

Any amendment requires a NEPA analysis such as the current EIS. Significant amendments must be approved by the Regional Forester. "Significance" for purposes of amendments is defined by NFMA and is different than "significance" as defined by NEPA.

The Forest Supervisor will determine whether any amendments are "significant" or "non-significant". In either case, an appropriate decision document would be prepared based upon environmental analyses and public disclosure.

1.4 REASONABLY FORESEEABLE DEVELOPMENT (RFD) SCENARIO

Activity that occurs after lease issuance can create physical, biological, and social impacts. The RFD provides a basis for assessing environmental effects based upon the best estimate of the activity that might occur in the next 15 years. Future exploration and development may not occur exactly where predicted in the RFD scenario. At best, the RFD scenario represents an estimate based upon the most recent scientific information available. The site-specific RFD forecast can serve as the basis for determining the environmental effects of leasing decisions for "specific lands" throughout the EIS decision area regardless of whether a specific area was, or was not, forecast to be impacted in the RFD scenario. The RFD incorporates historical oil and gas development information, other known geologic information, and interpretation of the information by BLM and FS geologists. See Appendices A and B.

1.5 FEDERAL MANAGEMENT OF LEASES AND ASSOCIATED DEVELOPMENT

Determination of lease parcels upon which surface activity is excluded must be identified at the leasing stage as specifically required by the 36 CFR 228 (E) regulations, and is one of the purposes of the EIS. A major factor in close examination of connected actions is to identify which tracts should be stipulated NSO at the leasing stage.

The Federal Leasing Process

The BLM is responsible for issuing oil and gas leases on federal lands and on private lands for which the federal government retains mineral rights split estate. Within the Decision Area there are approximately 826 acres of split estate minerals. The BLM cannot issue leases for lands administered by the FS without their consent. The Mineral Leasing Act of 1920, as amended, and the Mineral Leasing Act of 1947 for Acquired Lands provide the legislative authority for federal leasing. Title 43, Parts 3000 and 3100 of the Code of Federal Regulations provides the regulatory basis for administering federal leasing by the BLM.

Competitive and Noncompetitive Leases

The BLM issues two types of oil and gas leases: competitive and noncompetitive. Both types of leases are issued for a 10-year period under the Energy Policy Act of 1992. Maximum lease size is 2,560 acres for competitive lease and 10,240 acres for noncompetitive leases. Noncompetitive oil and gas leases may be issued only after the lands have been offered at a competitive oil and gas lease sales and have not received a bid. By law, oral competitive oil and gas lease sales are held at least quarterly. Requests for consideration of lands to be made available for leasing come from three sources:

1. **Expression of Interest -** A written letter from a member of the public requesting BLM to offer certain lands at a competitive oil and gas lease sale.

2. **Presale Noncompetitive Offer -** A noncompetitive oil and gas lease offer can be filed prior to a competitive oil and gas lease sale for lands which are available for leasing but which have not been through a competitive sale. Two exceptions are: (1) those lands which are in a one-year period subsequent to the expiration, termination, relinquishment or cancellation of leases containing the lands; and (2) those lands included in a Notice of Competitive Lease Sales. If the offer contains these excepted lands, the offer will be rejected. However, these lands will be treated as having an expression of interest and will be offered for sale without any priority being established.

   If no bids are received for parcels having pending presale offers, the presale offered lands are automatically issued to the offeror. If a bid is received, the presale offer is rejected. The presale offer must be in compliance with 43 CFR 3110.

3. **Surface Managing Agency Request -** Lands may be identified for leasing by any surface managing agency (SMA), such as the FS. Normally the lands are identified according to a priority agreement between the surface management agency and the BLM. Examples of such lands would be areas subject to drainage from adjacent producing wells or a parcel needed to fill a spacing unit for drilling.

All lease requests for lands within the National Forest System must be sent to the FS for their leasing recommendations and any specific stipulations that may be required. The BLM may not issue a lease if the FS objects or withholds consent. FS comments and any mitigating stipulations must be received prior to the lands being offered for competitive leasing.

After all regulatory requirements have been met and all stipulations have been received from the FS, the BLM includes the lands in an Oil and Gas Competitive Sales List. The sales list includes the legal description for each parcel and identifies the appropriate stipulations. Copies of the stipulations are attached to the Notice. The sales list must be posted in the BLM State Office in Billings, MT., the BLM District Office in Miles City, MT., the FS Supervisors Office in Billings, MT., and the Beartooth Ranger District Office in Red Lodge, MT for 45 days prior to the sales. Public comments can be submitted to the BLM during this posting time. The public may protest a lease offering at this time. Protest responses are made by the BLM. However, the FS assists in preparation of a response for any lease parcel on National Forest System lands.

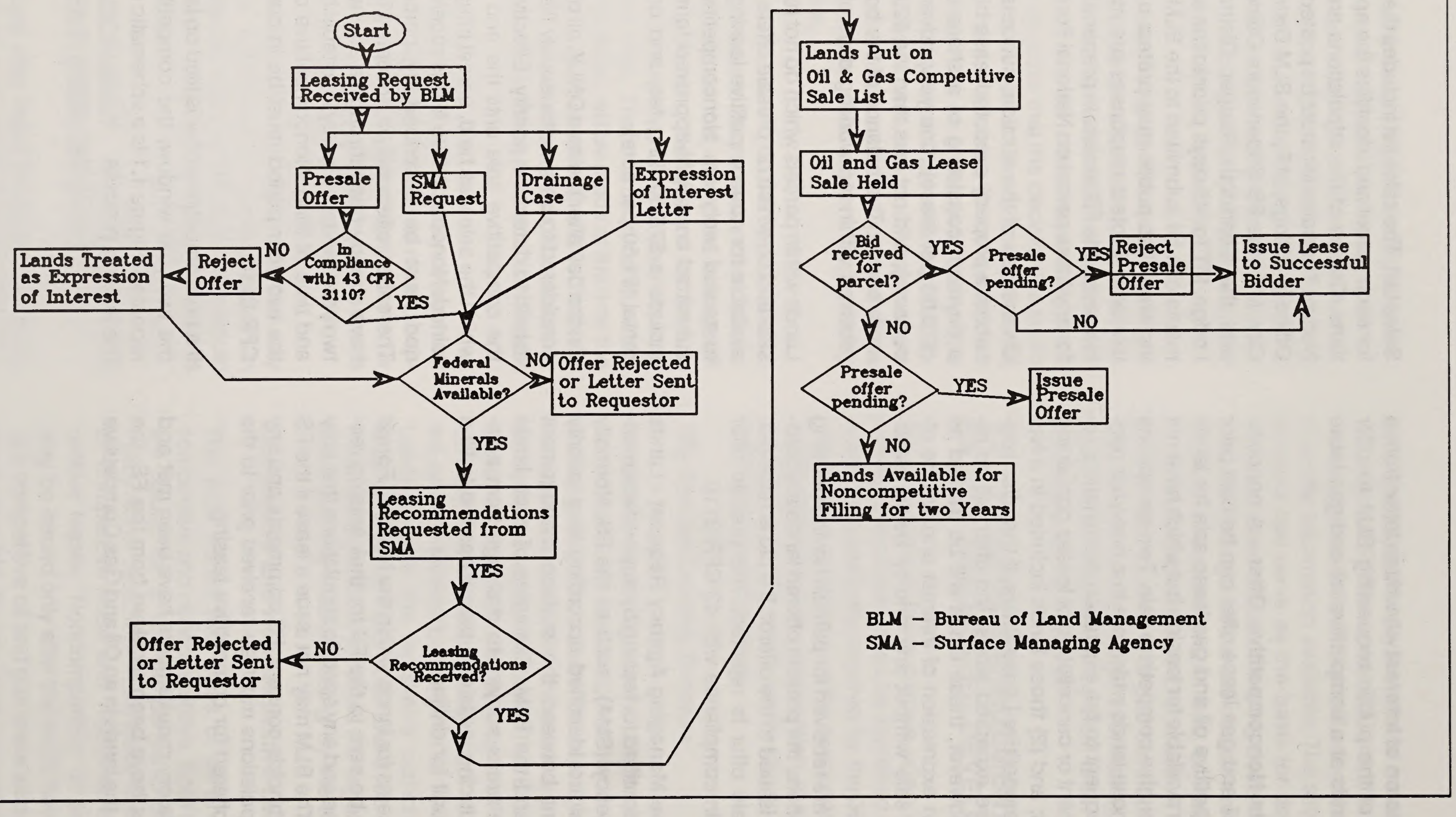
On the day of the auction, successful bidders must submit a properly executed lease bid form and make a payment consisting of a share of the sale costs ($75.00 per lease), one year advance rental ($1.50 per acre), and not less than the $2.00 per acre minimum bonus. The balance of the bonus bid must be received within ten working days of the auction.

Lands within parcels which do not receive a bid at the sale and on which no presale offers are pending, are available for noncompetitive leasing for a period not to exceed two years. Noncompetitive offers must be submitted on a BLM-approved form, and they must include a $75.00 filing fee, and one year advance rental ($1.50 per acre).

On the day after the sale ONLY, all offers received are considered to be simultaneously filed and a drawing is held to determine priority. Effective the day AFTER the competitive sale until the end of the month in which the sale was held, parcel integrity will be maintained. Noncompetitive filings received up to this period must be described by parcel number only. Thereafter, offers will be accepted for any lands that have already been through a sale and are within the two year window. Priority is established as of the date and time of filing. Noncompetitive offers filed during the two year period must be in compliance with 43 CFR 3110.

If a noncompetitive offer is filed on lands that are past the two-year window, the competitive sale cycle is repeated. Figure 1.1 is a schematic representation of the leasing process.

Figure 1.1


Start
Leasing Request Received by BLM
Presale Offer
SMA Request
Drainage Case
Expression of Interest Letter
In Compliance with 43 CFR 3110?
NO
YES
Reject Offer
Lands Treated as Expression of Interest
Federal Minerals Available?
NO
Offer Rejected or Letter Sent to Requestor
YES
Leasing Recommendations Requested from SMA
YES
Leasing Recommendations Received?
NO
Offer Rejected or Letter Sent to Requestor
YES
Lands Put on Oil & Gas Competitive Sale List
Oil and Gas Lease Sale Held
Bid received for parcel?
YES
Presale offer pending?
YES
Reject Presale Offer
Issue Lease to Successful Bidder
NO
NO
Presale offer pending?
YES
Issue Presale Offer
NO
Lands Available for Noncompetitive Filing for two Years
BLM – Bureau of Land Management
SMA – Surface Managing Agency

Standard Lease Terms and Stipulations

A lease does not convey an unlimited right to explore or an unlimited right to develop any oil or gas found under the land. Leases are subject to terms derived from legal statutes and measures to minimize adverse impacts to other resources. Stipulations modify the rights the government grants to a lessee. The lease terms, conditions, and stipulations are known by potential lessees prior to any sale, and must be applied at the time of APD which initiates ground disturbing activities.

It is important to recognize that the Authorized Forest Officer has the authority to modify the siting and design of facilities, control the rate of development and timing of activities as well as require other mitigation under Sections 2 and 6 of the Standard Lease Terms (BLM Form 3100-11) and 43 CFR 3101.1-2.

Standard Lease Terms are contained in BLM Form 3100-11, June 1988, Offer to Lease and Lease for Oil and Gas. (See Appendix E). Standard Lease Terms apply to all leases and provide the lessee the right to use the leased land as needed to explore for, drill for, extract, remove and dispose of oil and gas deposits located under the leased lands. Operations must be conducted in a manner that minimized adverse impact to the land, air, water, cultural, biological, and visual elements of the environment, as well as other land uses or users. Federal environmental protection laws such as the Clean Water Act, Endangered Species Act, and Historic Preservation Act, will be applied to all lands and are included in the standard lease terms. If threatened or endangered species, objects of historic, cultural, or scientific value, or substantial unanticipated environmental effects are encountered during construction, all work affecting the resource will stop and the land management agency will be contacted.

Stipulations: When there are resource values, uses, or user conflicts identified that cannot be managed or accommodated by the Standard Lease Terms, a lease stipulation may be necessary. Stipulations may be applied to all, or part, of a lease parcel, as required for resource protection. Stipulations may be necessary if the authority to control the activity on the lease does not already exist under laws, regulations, or orders.

The leasing analysis must show that less restrictive stipulations were considered and determined to be insufficient to protect the resource. Once this determination has been made, the appropriate stipulations will be attached to all leases on available lands with resource values, uses, or user conflicts that cannot be accommodated by less restrictive mitigation.

Stipulation forms will display the need for the lease stipulations and establish guidelines for granting waivers, exemptions, or modifications (WEM). Substantial WEM after lease issuance are subject to public review for at least a 30-day period in accordance with Section 5120.f of the FOOGLRA.

A full list of stipulations is given in Appendix E.

Bonding

The lessee, or the lessees' operator, must furnish a lease bond of at least $10,000 before beginning any surface-disturbing activities related to drilling. In lieu of individual lease bonds, lessees, owners of operating rights (sublessee), or operators may furnish a bond in an amount of not less than $25,000 covering all leases and operations in any one State; or a bond in the amount not less than $150,000 covering all leases and operations nationwide.The bond is intended to ensure compliance with all lease terms, including protection of the environment. The BLM or the FS may increase the bond amount any time conditions warrant such an increase. These conditions include:

- The operator/lessee has a history of previous violations
- The number and condition of unplugged wells
- Request from the Dept. of Interior Minerals Management Service that bond coverage be increased to cover uncollected royalties
- Potential adverse impacts to the surface owner in split estate situations.

Expiration or Termination of a Lease

Oil and gas leases expire at the end of their term. A term is ten years for both competitive and noncompetitive leases. Leases that produce paying quantities of oil or gas do not expire until production ends.

Leases without economically producible wells automatically terminate if the lessee fails to make full and timely payment of the annual rental. The rental must be received by the Federal government on or before the anniversary date of the lease.

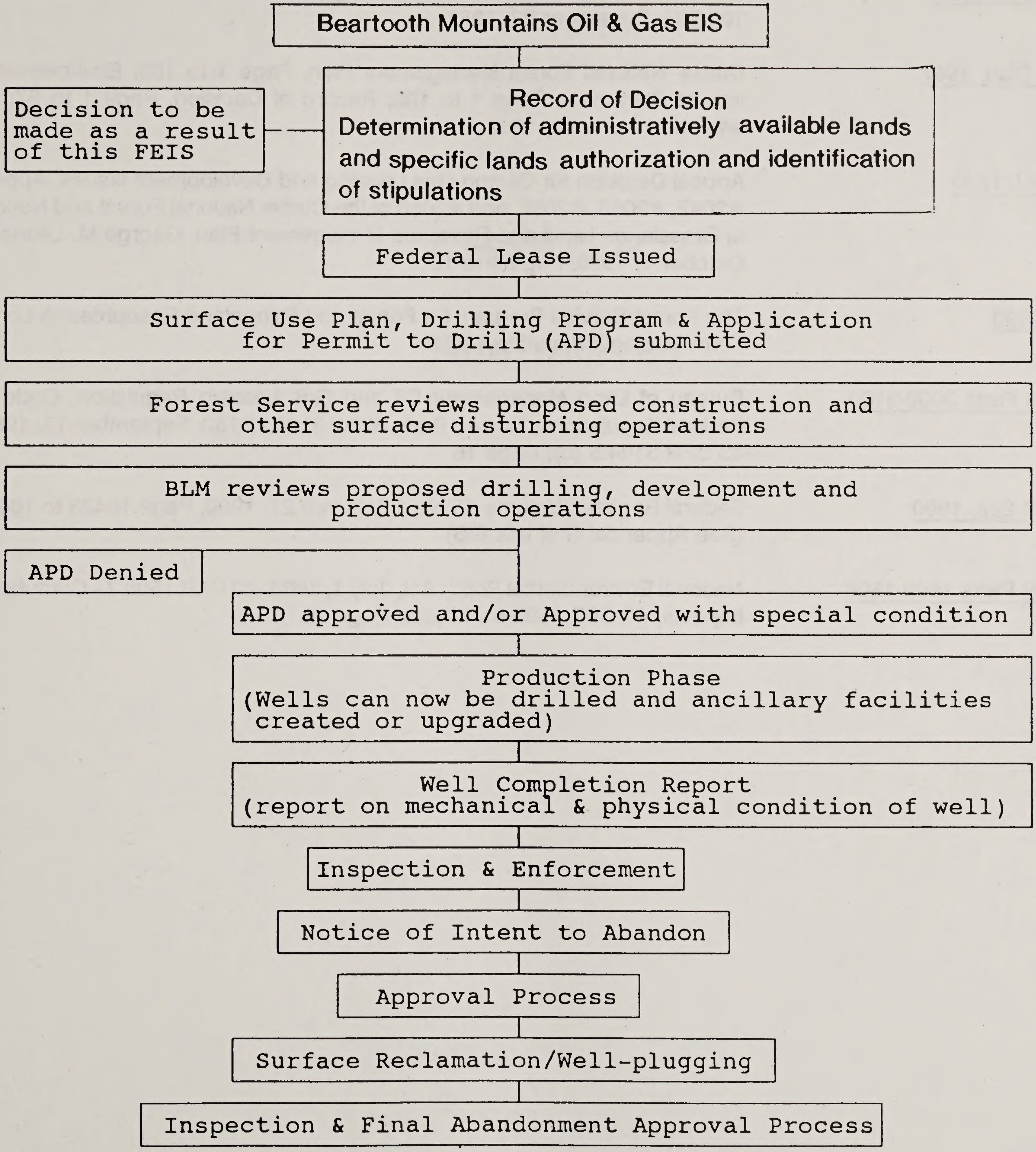
The owner of a lease also may surrender the lease in whole or in part by filing a written relinquishment with the BLM State Office having jurisdiction over the leased Federal lands. A relinquishment is effective on the date it is filed. The lessee is responsible for plugging any abandoned well, other work required by the BLM to place the leasehold in proper condition and bringing the lease account into good standing. If the lessee fails to perform the required abandonment work, the bond would be used to pay for the costs of abandonment, and the lessee would be prohibited from leasing any additional Federal lands.

Federal Management of Lease Activities

A complete description of typical oil and gas activities that may take place after a lease is issued is included in Appendix C. The Federal management of these activities, including additional permitting, reporting, and abandonment approval processes are also described. Figure 1.2 summarizes the management of oil and gas activities on Federal leases by the FS and the BLM.

Figure 1.2

Summary of Post-Lease Activities and Decision Points


Beartooth Mountains Oil & Gas EIS
Decision to be made as a result of this FEIS
Record of Decision
Determination of administratively available lands and specific lands authorization and identification of stipulations
Federal Lease Issued
Surface Use Plan, Drilling Program & Application for Permit to Drill (APD) submitted
Forest Service reviews proposed construction and other surface disturbing operations
BLM reviews proposed drilling, development and production operations
APD Denied
APD approved and/or Approved with special condition
Production Phase
(Wells can now be drilled and ancillary facilities created or upgraded)
Well Completion Report
(report on mechanical & physical condition of well)
Inspection & Enforcement
Notice of Intent to Abandon
Approval Process
Surface Reclamation/Well-plugging
Inspection & Final Abandonment Approval Process

CHAPTER 1

Literature Cited

Conner vs Burford 1988	Conner vs Burford Cite as 848 F2D (9th Circuit, 1988), Page 1441 and 1462
FOOGLRA 1987	Federal Onshore Oil and Gas Leasing Reform Act of 1987, Public Law 100-203, December 22, 1987
Forest Plan, 1987	Custer National Forest Management Plan, Page 1 to 185; Environmental Impact Statement, Page 1 to 106; Record of Decision, Page 1 to 37; as amended, June 10, 1987
Leonard, 1990	Appeal Decision for Oil and Gas Leasing and Development Issues, Appeal #2042, #2056, #2057, and #2060 of the Custer National Forest and National Grasslands Land and Resource Management Plan, George M. Leonard, October 1, 1990, Page 1 to 18
RPA, 1990	The Forest Service Program for Forest and Rangeland Resources, A Long-Term Strategic Plan, May 1990,
Title 43 Parts 3000-3100	Bureau of Land Management Oil and Gas Leasing Regulation, Code of Federal Regulations, Title 43 Parts 3000, 3100 - 3150; September 15, 1988; 43 CFR 3104.5 (b); Page 16
36 CFR 228, 1990	Federal Register, Volume 55 No. 55, March 21, 1990, Page 10423 to 10452 (See Appendix G of this EIS)
40 CFR Parts 1500-1508	National Environmental Policy Act, July 1, 1986; 40 CFR 1508.7 - Cumulative Impacts, 40 CFR 1508.8 - Effects; Page 28

CHAPTER 2

Alternatives

CHAPTER 2

2.0 INTRODUCTION

This chapter describes alternatives developed in response to issues and concerns identified in the scoping process that, wholly or partially, meet the purpose and need identified in Chapter 1. Included is a comparison of the effects of the alternatives summarized from the analysis of alternatives in Chapter 4.

2.1 ALTERNATIVE DEVELOPMENT PROCESS

Issues were identified in the public scoping process initiated June 1991 and through internal agency scoping (see list of preparers, Chapter 6). The scoping process and a summary of issues is discussed below.

2.1.1 SCOPE OF THE EIS

The scope of the EIS was established by an interdisciplinary team of specialists from the Forest Service. The team incorporated input received through the public scoping effort. Preliminary identification of the issues was done by the interdisciplinary team prior to full public involvement. The scope of this EIS is the determination of the area involved in the analysis, which alternatives should be considered based upon projected intensity of development, issues, and how issues will be analyzed.

An integral part of the scoping process is the Reasonably Foreseeable Development (RFD) scenario (Appendix A) which identifies, as a basis for analysis, the expected intensity and duration of activity. The Reasonably Foreseeable Development scenario is based upon the best information available for geologic setting and the demand for petroleum products.

Public involvement played an important role in developing an analysis that addresses the concerns of the citizens who may be affected by the final decision. Scoping began with a mailed information package in June of 1991. A series of open meetings were held to encourage public participation in the analysis process. The meetings were announced by press releases to State and local media. FS personnel were present to answer questions and record comments and concerns. Public meetings were held in Billings, Columbus, and Red Lodge in July 1991. In response to public comments, the scoping period was extended and two additional open meetings were held in Billings and Red Lodge in September, 1991. A more complete description and summary of public involvement is included in Chapter 5.

2.1.2 ENVIRONMENTAL ISSUES

The issues described below were developed by the interdisciplinary team charged with managing the process for this Environmental Impact Statement. (See list of preparers - Chapter 6.) These issues are based on careful consideration of all comments and input received from 518 respondents during the scoping period and are incorporated into issue statements that drive the analysis of effects. The analysis herein is based upon the recognition of public concerns and the elements that will satisfy or at least address their expectations. The issues are considered from a cause/effect relationship with the effect being considered from the human perception rather than the effect upon the resource alone.

Environmental effects are caused by, or are the result of, reasonably foreseeable exploration and development activities (Appendix A, B, C) such as road building, pad construction, drilling and other site operations, increased population and human activity, and associated actions such as chemical leaks/spills, machinery emissions, fire, and traffic.

These issues were placed into one of three categories: **Ecosystem Integrity, Natural Setting, and Social/ Economics**. The full array of alternatives developed emphasizes or de-emphasizes these issues in differing combinations. They are grouped into issue categories and broken into components for ease of tracking and analysis as follows.

Changes to Ecosystem Integrity

1) **Soils and Vegetation: what will be the effects of oil and gas activities on:**

- Reducing acres and effectiveness of riparian areas?
- Reducing vegetative habitats, including threatened, endangered and sensitive (TES) plants?
- Plant communities, especially habitat and fragmentation of communities?
- Reclamation success potential, especially on fragile (alpine) soils?

- Introduction and spread of noxious weeds?

- Integrity of the Meeteetse Spires Rock Preserve?

The above sub-issues will be addressed in the analysis. Following are some sub-issues that were identified and for various reasons stated were not carried through the analysis.

- Will activities create or exacerbate an acid rain situation?

  Response: The geologic target depicted in the RFD is not anticipated to produce hydrogen sulfide (the substance which could produce acid rain). Therefore, the potential for acid rain production is not anticipated to increase from baseline conditions.

- Lack of "indicator species" for the alpine zone.

  Response: No indicator species plants have been identified for the alpine area. The biodiversity level analysis considers overall biological situations for the areas plants and animals. Consultation with the US Fish and Wildlife Service on all species of concern is incorporated into the analysis as well as available information on TES species. Collection of data on all species and development of "indicator species" is beyond the scope of the analysis.

- Subsurface water channels should be identified and avoided unless total reclamation in the event of contamination can be guaranteed.

  Response: Identification of "subsurface water channels" is beyond the scope of the analysis and possibly the ability of geologists to predict without further drilling. This analysis deals with the known and reasonably foreseeable future. Ground-water sources are protected by requirements for well casing and cementing as explained in Appendix C.

- Consider directional drilling to minimize damage to fragile environments.

  Response: Consideration of surface resources (including minimizing and/or mitigating impacts to surface resources), while allowing for subsurface retrieval of a valuable resource, is an integral part of the analysis. The predicted impacts of oil and gas exploration and development under a range of alternatives, including the mitigation measures to be applied, are disclosed in the EIS. The actual drilling techniques to be used in developing oil and gas resources are not dictated by the decision to be made from this analysis. The analysis of various drilling options is done at the Application for Permit to Drill (APD) stage.

- Consider studies of all flora and fauna, not just species of concern and/or large and obvious species, before making a decision.

  Response: This type of data collection and analysis is beyond the scope of this analysis. The level of decision based upon the Reasonably Foreseeable Development scenario for the next 15 years does not warrant this level of study. Gathering data on every species that might become a concern is not reasonable. The biodiversity analysis considers the overall biological environment including a reasonable range of potentially affected plants and animals on which there is available information. Threatened, endangered, and sensitive species will be discussed individually, since they are "species of special concern." At the APD stage, when a specific drilling site is identified, an on-site investigation of all species is conducted. Appropriate mitigation measures are applied at that time.

- The Forest Service should "guarantee" total reclamation of high elevation areas or no permanent or long term damage from drilling accidents.

  Response: Guarantees are beyond the scope of this analysis. Many controls exist for each phase of oil and gas leasing and development. For instance, each phase of operations is bonded for cost of returning the land to productivity. The nature of exploration and development includes unknown items in spite of the vast experience gained by industry and the surface management agencies. No one can absolutely predict the future or provide "iron-clad" assurance that every eventuality has been covered. Unfortunately, this does not satisfy some of the expectations of the public. We work with what is known and what can be reasonably predicted and incorporate new information as it becomes available. Where conditions change from what has been analyzed, additional

NEPA analysis must be completed before continuing.

- Effects of helicopter flights in the area.

  Response: Helicopter flights were the subject of an Environmental Assessment (EA) completed in 1985. This EA is incorporated by reference. Specific use of helicopters for geophysical exploration or an APD would be addressed in a NEPA document prepared for the Surface Use Plan of Operation submitted at the APD stage.

2) What will be the effects of oil and gas activities on fish and wildlife habitat and populations, specifically:

Sub-issues:

- Will there be direct mortality to wildlife and aquatic species?
- Will there be loss of habitat and carrying capacity.
- Will displacement of species from currently occupied home ranges occur?
- Will there be a stress response (increased energy consumption levels) by wildlife?
- Will there be effects on aquatic organisms and associated habitats due to changes in water quantity and quality?
- Will there be fragmentation of populations, habitat, and home ranges?
- Will there be changes in mortality of wildlife and aquatic species from increased human activity?
- Will displacement of wildlife species affect hunting opportunities?
- Will known TES species and habitats be affected?
- Will displacement of big game herds from traditional ranges occur?

The above sub-issues are considered in the analysis. The following sub-issues have been dismissed for the reasons stated:

- The Forest Plan should be modified to change the management prescription from "D" to "C" to protect significant wildlife values in the Line Creek Plateau area.

  Response: The intent of this analysis is to implement approved Forest Plan direction for oil and gas leasing. This process is not designed to reallocate land to resource uses or emphasis different from those assigned in the Forest Plan. However, should the analysis identify new information or conditions unknown at the time the Forest Plan was prepared, this information will be analyzed. If conditions warrant, a modification in the form of an amendment to the Forest Plan may be made. It may also be appropriate to recommend changes to allocations that would be considered at the time a full review or revision of the Plan is made.

Natural Setting

3) What will be effects the from oil and gas activities on aesthetics, specifically:

Sub-issues:

- Will there be changes in landscape, odor and audio components from existing appearance, smell, or sound? Will there be changes to the landscape surrounding the Scenic Byway?

4) What will be the effects from oil and gas activities on recreation?

Sub-issues:

- Will there be changes to recreation sites or settings?
- Will recreation-user displacement occur if expectations are not met and where will this occur? .
- Will there be changes in the character of those streams under consideration for Wild and Scenic River recommendation?

5) What will be the effects from oil and gas activities on cultural resources?

Sub-issues:

- Will there be changes to the cultural/ religious site or setting?

- Will displacement of users of these sites, including Native Americans, occur because user expectations are not met?

6) **What will be the effects from oil and gas activities on inventoried roadless areas and designated wilderness areas?**

Sub-issues:

- Will there be changes in the character of the Wilderness?

- Will there be changes in the character of inventoried roadless areas?

The above sub-issues are considered in the analysis. The following sub-issues have been dismissed for the reasons given.

- Consider eligibility of all streams in the area under the Wild and Scenic Rivers Act and disclose effects of leasing on eligibility.

Response: Evaluation of wild and scenic rivers is outside the scope of this analysis. The Custer National Forest has completed the analysis of wild and scenic rivers and has made its' recommendations. Results of this analysis are on file at the Supervisors' Office, 2602 1st. Ave. N, P.O. Box 2556, Billings, MT, 59103. The results are incorporated into this analysis.

Social and Economics

7) **What are the effects of oil and gas activities on Quality of Life.**

The following sub-issues are considered in the analysis.

Sub-issues:

- Will there be changes in demand for and quantity of community services and amenities?

- Will there be changes in demand for and types of outdoor recreation experiences?

- Will there be changes in composition (diversity) of area population?

- Will there be changes in traffic patterns and safety hazards associated with traffic volume and load capacity of existing bridges?

- Will there be changes to lifestyles, quality of life, perceptions, or spiritual values local residents place on the area?

- Will there be changes to human health caused by changes in water and air quality? (Note - in Chapters 3 and 4 air and water will be discussed as a resource under issue #1 for effects to the resource as well as under issue #7 for effects to human health.)

- Will oil and gas activities result in displacement of population due to changes to aesthetic quality of area?

The following sub-issues have been dismissed for the reasons stated.

- The Forest Service is inconsistent in prohibition of mountain bikes off trails on extremely sensitive environment, yet similar habitat can be opened to the ravages of truck traffic, drilling pads, etc.

Response: Permitted commercial use, such as oil and gas development, results in carefully controlled use that is under stringent restrictions designed to minimize or mitigate impacts to the environment. Each activity is issued a specific permit for a particular use in a specific area. Extremely sensitive environments are totally avoided in most cases. Opening large areas to public mountain bike use may result in increased and more widespread damage than commercial use as public use is not under permit and is much more difficult, if not impossible, to monitor and control under agency funding and personnel limits. Analysis of the differences between these uses is beyond the scope of this analysis.

- Emergency procedures be developed and in place prior to drilling activity and supported by adequate local resources to respond to an emergency to guarantee no permanent or long term damage.

Response: Consideration of emergency operations is part of the APD stage of analysis.

Emergency procedure plans are required for all wells. An APD is not approved unless it contains a specific plan to deal with spills or other hazards that might arise as a result of drilling. Although there is no way to guarantee that an operation would not have an accidental spill, the procedures that are required to ensure the safety (environmental and human) of the operation normally provide for the prevention of accidents and the mitigation of damages from any that may occur. This process is described in Appendix C.

- Toxic or hazardous materials disposal.

Response: Disposal of any toxic waste is governed by Environmental Protection Agency (EPA) standards and is addressed at the APD stage in the Plan of Operations.

- A "worst case scenario" be prepared that shows the effects of Red Lodge city water supply unsuitable for consumption without additional treatment facilities being added.

Response: The analysis is predicated upon a Reasonably Foreseeable Development scenario which is based upon the best available geologic information and on a prediction of industry's interest in the area for the next 15 years. A worst case scenario is particularly unwarranted in light of the limited extent of reasonably foreseeable development in this time period. The requirement for worst case analysis was rescinded April 25, 1986. (51 Federal Register, 1986 pg. 15625)

- Consider the anticipated job training and commitment of hiring of area residents.

Response: Job training and commitment to hiring locals is outside the authority of the agency. The Forest Service does not conduct exploration and other related oil and gas activities, nor can the agency require a private firm to hire locals as a part of the lease. Such an action would preclude the rights of private industry to determine their own workforce needs.

8) What are the effects to economic stability and revenue?

Sub-issues:

Will there be a change in accessibility to the oil and gas resource?

- Will there be changes in demand for and number of community services and amenities?

- What will be the changes to the tax base and revenues for local, state, and Federal government units?

- Will there be changes in employment and income of the local population?

The following sub-issues have been considered and dismissed for the reasons stated:

- Examine "the tradeoffs of short term needs of a few (oil company profits) versus long-term needs of many (national, state, and local economies and quality of life), compare the present worth of oil company profits vs all costs/ losses to local economies (environmental, reduced growth) and national costs (continued pollution, health losses, acid rain costs, global warming costs with the present worth of high quality life, economic growth, greater prosperity, and the development of efficiency alternatives."

Response: The economic analysis prepared for the EIS assesses those economic factors relevant to the level of decision being made. The "values" mentioned are unquantifiable by presently accepted means. Opinions on the worth of these items are subjective, that is, they are subject to each person's values, and thus, cannot be reduced to terms that are comparable to commonly accepted economic factors. For instance, some people would place a high value on the employment opportunities that commodity production provides, and consider the "needs of the many" as justification for oil and gas production (that is, that production contributes to meeting the nation's needs for energy).

- Consider alternative energy sources in the analysis.

Response: Consideration of alternative energy sources is beyond the scope of this analysis. The Congress and Executive Branches of government determine this type of policy for the nation.

⅛Preservation of the oil and gas resource.

> Response: The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of mineral and energy resources on NFS lands to help meet the present and future needs of the Nation.

Develop geothermal resources of the area.

> Response: There is no demonstrated geohydrologic connection between the analysis area and geothermal features of the area, specifically those of Yellowstone National Park. The areas are separated structurally. Additionally, oil and gas activities are strictly regulated in accordance with Federal and state requirements. These require the use of casing to physically isolate the well bore from rock strata with ground water and geothermal resources.

2.2 ALTERNATIVES DROPPED FROM FURTHER CONSIDERATION

The number of alternatives that could be developed is unlimited. The following alternatives were eliminated from detailed consideration for the reasons listed.

1. Maximum field development: This alternative, also referred to as full field development by some, consists of prediction of the ultimate level of development that might occur to fully utilize the potential oil and gas resources of the area. The intent is to predict the total amount of access, drilling and all ancillary facilities (pipelines, tank batteries, treaters, pumps, etc) needed to recover the fluid resources.

Consideration of this alternative was suggested during the public scoping process. Determination of the size of a reservoir and its ultimate production is dependant upon drilling. There is no way to accurately predict the size of a discovered field until this is done. The time and cost to run speculative analysis that results in questionable data is not justified. This type of analysis is not required under NEPA, (51 Federal Register, 1986, pg. 15625). This type of analysis produces undue speculation that cannot be supported with reasonable estimate of effects. Mineral case law of Conner vs Burford (1988) and the Federal Onshore Oil and Gas Leasing Reform Act (1987) set out the Reasonable Foreseeable Development (RFD) scenario as the basis for a reasoned analysis based upon the most recent scientific data available.

2. Withdraw all mineral resources from entry and/or leasing: This was suggested in public responses during the scoping period. Under this alternative the entire area would be recommended for mineral withdrawal to protect the other resource values next to the Absaroka Beartooth Wilderness. This would preclude any further exploration for fluid minerals anywhere within the area.

Withdrawal of minerals for areas over 5,000 acres is a function of Congress based upon specific recommendations of the land management agency. The Forest Service feels that authorities available to it under the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and the implementing regulations (36 CFR 228) provide sufficient latitude to protect surface resource values without withdrawal. A range of options exist that allow land managers the ability to limit availability or not lease without mineral withdrawal. Furthermore, the direction given in Forest Service minerals policy and the Resources Protection Act (RPA, 1974) is to develop the available mineral resources where possible for the good of the nation. Analysis of policy is beyond the scope of this EIS.

3. Develop a National Energy Policy before any more leasing: This alternative was suggested in the public scoping comments received. It was recommended that alternative sources of energy be evaluated along with the natural oil and gas resources that may be in the area. This alternative, or alternatives, would include solar, electric, and other sources to allow comparison with natural fluid minerals. If the decision maker should choose an alternative energy alternative it would mean that natural fluid mineral resources would not be made available and industry effort would be directed at developing the alternative source.

Development of a National Energy Policy is outside the scope of this analysis. Such decisions are made at the Legislative and Executive Branch level of government. The Forest Service policy is to encourage mineral resource development where such use is compatible with other resource uses under the Multiple Use concept. The Resources Protection Act (RPA 1974) further mandates that we make available mineral resources for the national interest. The Forest Service cannot delay execution of the management direction given to it unless directed to do so by appropriate levels of the government.

4. Lease all available lands with Standard Terms: This alternative would lease all available lands under the terms of Bureau of Land Management Form 3100-11. (See Appendix E). The terms in this document represent the minimum stipulations for environmental protection that are applicable to all leases. In some areas they may be less restrictive than the requirements of the Custer Forest Plan, and would require amendment of the Forest Plan in order to implement without additional stipulations. Areas that fall under regulations, Executive Orders, or laws such as the Threatened and Endangered Species Act, National Historic Preservation Act, or others would still be given the necessary protection as stipulated in Section 6 of Form 3100-11. Where resources requiring specific protection occur within a lease area, the lease may contain a lease notice to alert the lessee to the possibility of some restrictive requirement that could occur at the time an Application for Permit to Drill is submitted and with specific well siting.

This alternative was not carried through full analysis since the Forest Plan has already determined the minimum resource protection standards needed by Management Area. Alternative 5 portrays a major portion of the analysis area under standard terms. The other areas requiring additional protection in Alternative 5 are a step below the minimums required in the Forest Plan. To go further from the Forest Plan minimums would not serve any useful purpose. Where obligatory requirements exist, such as Threatened and Endangered Species, it is not reasonable to apply lower standards as this would require an Act of Congress to approve such an analysis which is beyond the scope of this document.

2.3 ALTERNATIVES CONSIDERED IN DETAIL

This analysis presents two sets of alternatives. The first set presents four alternatives that revisit the decision of what lands are available for leasing on the Beartooth Ranger District. This decision is referred to as the "availability decision". These "availability alternatives" are designated by letter - A, B, B1, and C. Alternative B1 was developed in response to public comments received on the draft EIS.

The second set of alternatives are designated by number - 1, 2, 3, 4, 4A, and 5. Alternative 4A was developed in response to public comments received on the draft EIS. These are referred to as "leasing alternatives" and decisions regarding them are "leasing decisions". Leasing decisions can only be made with reference to lands that have been made available in the first decision (that is, the availability decision). Any lands that are NOT available (either through decisions already made in the Forest Plan or made during this analysis) are not considered further during the leasing decision. The leasing decision basically considers whether or not to lease lands that are available, and if to lease, then considers what stipulations to place on leases.

This section displays a range of alternatives with different environmental effects and mitigation measures. The alternatives respond to the issues and present a broad range as required under NEPA. To accomplish the actions identified in Chapter 1 the availability decision and leasing decision will be made using two different sets of alternatives.

Availability Alternatives

The reader will not find a specific analysis of each of the availability alternatives. Rather, they provide the responsible official with another option at the time the decision is made to lease or not lease. It allows the responsible official to make a portion of the decision area Not Available for leasing based upon the analysis. Information regarding effects of leasing, new law or regulations, or other concerns disclosed through the analysis may result in a decision to remove portions of the decision area from availability.

The "lands administratively available" decision was made for all National Forest System lands in the decision area by the Forest Plan Record of Decision. Portions of the 1987 decision were appealed; specifically, lands administratively available for leasing. In reviewing the appeal, the Chief of the Forest Service affirmed the Forest Plan 1987 lands administratively available decision on all points in October of 1990.

There is, however, a need to ensure the consistency of the Forest Plan availability decision with the Federal Onshore Oil and Gas Leasing Reform Act of 1987, and the implementing regulations found at 36 CRF 228 (E). Those lands in Management Areas H and I are not available as they are removed by 36 CFR 228.102 (b)(2) and the Wilderness Act, respectively.

Four availability alternatives were developed to provide the decision maker a full range of alternatives regarding lands administratively available for leasing. Table 2.1 illustrates the four alternatives developed.

TABLE 2.1
Lands Administratively Available By Management Area and Alternative

Forest Plan Management Areas	Alternative A	Alternative B Forest Plan & No Action	Alternative B1	Alternative C
Management Area B				
Bad Canyon	NA	A	A	A
Little Rocky	NA	A	A	A
Black Butte	NA	A	A	A
Butcher Creek	NA	A	A	A
Management Area C				
Meyers Creek	NA	A	A	A
Picket Pin	NA	A	A	A
Stillwater	NA	A	A	A
Palisades	NA	A	A	A
Line Creek	NA	A (Core NA)	A-Part NA	A
Cooke City	NA	A	A	A
Management Area D				
Picket Pin	NA	A	A	A
Fishtail	NA	A	A	A
Butcher Creek	NA	A	A	A
Palisades	NA	A	A	A
Line Creek	NA	A	NA	A
Management Area E				
Stillwater	NA	A	A	A
Management Area F				
Woodbine	NA	A	NA	A
W. Rosebud	NA	A	NA	A
E. Rosebud	NA	A	NA	A
Grizzly Peak	NA	A	NA	A
Cascade	NA	A	NA	A
Basin	NA	A	NA	A
Palisades	NA	A	NA	A
Rock Creek	NA	A	NA	A
Management Area G				
Fishtail	NA	A	A	A
Red Lodge	NA	A	A	A
Management Area P				
Meyers Creek	NA	A	A	A
Rock Creek	NA	A	A	A
Management Area R				
W. Fork Rock Creek	NA	A	NA	A
Management Area T				
Scenic Byway	NA	A	NA-Part A	A
Glacier Lake	NA	A	A	A

NA - Not Available, A - Available

Alternative A

All of the approximately 178,110 acres of National Forest System lands in the decision area as shown on Map 1A would be administratively **Not Available** for leasing. Existing leases on approximately 46,000 acres would continue until expiration or, if held by production, until exploratory drilling or actual production ceased or the lessee relinquishes rights.

This alternative minimizes the potential to develop Federal mineral resources and provides a baseline against which to compare effects of other activities in the area. It allows a comparison with the Forest Plan to determine if the original analyses is still valid or if conditions affecting availability have changed. Alternative A was developed as required by regulations found at 36 CFR 228 (E) and in response to public comments.

Selection of this alternative would require amendment to the Forest Plan.

Alternative B

This alternative represents the current course of action as detailed in the Forest Plan and allows for comparison of differences between the other availability alternatives. No change from the Forest Plan course of action constitutes the "No Action" alternative under NEPA for the availability decision. Alternative B responds to requirements of Federal Regulations (40 CFR 1502) and public comments received during the scoping process.

This alternative would be incorporated into leasing alternatives 1 through 4 and Maps for these alternatives display availability.

All lands in the decision area would be administratively available for leasing except approximately 860 acres of "the core, or that area not accessible by directional drilling" in Management Area C. For purposes of determining the unavailable acres it was assumed that any area over one mile from the boundary of the management area would be unaccessable under current technology.

For this alternative, no amendment to the Forest Plan would be necessary.

See Maps 1 through 7, Appendix G for alternatives 2, 3, and 4 and Table 2.2.

Alternative B1

This alternative uses Alternative B as a starting point and makes some changes in availability to address some key issues identified in the analysis and public comment process.

This alternative makes the following lands administratively not available for leasing:

- The top of Line Creek Plateau and the adjacent lands sloping to the north toward the Beartooth Highway, down to and including a strip of land one-half mile wide on either side of the Beartooth Highway for its entire length through the project area;
- A portion of Line Creek Management Area C from the southwestern corner near Line Lake running northesterly along the ridge in Sections 26 and 25 and then northerly along a ridge through the east half of Section 24, T9S, R19E, PMM to the edge of the Line Creek Plateau.
- All developed recreation sites (Management Area F); and
- The West Fork Rock Creek Drainage (Management Area R).

All other lands within the decision area would be administratively available for leasing, including the "core" area of Line Creek Management Area C.

Implementing this alternative would require amending the Forest Plan.

See Maps 1 through 7, Appendix G, for Alternative 4A and Table 2.2.

Alternative C

This alternative maximizes the potential for utilization of Federal mineral resources. The driving force is whether oil and gas exploration and development are possible based upon geologic predictions. Alternative C responds to requirements of Federal Regulations (36 CFR 228) and public comments from the scoping period.

- All 178,110 acres of National Forest System lands are available, including the core of Management Area C.

Selection of this alternative requires an amendment to the Forest Plan.

See maps 1 through 7, Appendix G, for Alternative 5 and Table 2.2.

TABLE 2.2
Summary of Acres by Availability Alternatives

	A	B	B1	C
Available Acres	000	177,250	124,230	178,110
Not Available Acres	178,110	860	53,880	000
Totals-Decision Area	178,110	178,110	178,110	178,110

LEASING ALTERNATIVES

The Forest Plan is the beginning point for the development of alternatives. The Forest Plan Record of Decision of 1987 addresses administrative availability, but no decisions regarding leasing of specific lands were made. Since 1987, leasing decisions have been made on a lease-by-lease basis using Forest Plan standards and guidelines. Priorities for lease authorization have been based on Bureau of Land Management and industry requests.

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 and the implementing regulations (36 CFR 228 (E)) of 1990 required the Forest Service to look at areas larger than individual leases. The court decision of Conner vs Burford (1988) also requires a site-specific analysis based upon reasonably foreseeable development. The alternatives considered represent a blend of these two requirements.

The planning process defined management area designations for discrete portions of the Ranger District. Each of these management areas has specific management direction and guidelines assigned. (Forest Plan Chapter 3, pages 41-100). Management areas attempt to treat similar resource areas with consistent management standards and guidelines. There are, however, some site specific considerations that individual units of the broader management area designation may contain that warrant attention.

The leasing alternatives are developed with a management area breakdown to highlight the specific need of the individual area rather than looking at only the broader management area direction. For the decision area considered in this EIS, there are nine different management area groups further divided into 31 discrete areas. In order for the responsible official and other readers to see the specific effects and possible changes that may be needed to the Forest Plan, adherence to these designations throughout the analysis is necessary . Maps 1 through 7, Appendix G, display the various management areas. Table 2.3 lists the applicable management area names and acreages.

TABLE 2.3
Management Areas in Beartooth Decision Area

MANAGEMENT AREA	MANAGEMENT AREA NAME	ACREAGE
B	BAD CANYON BLACK BUTTE BUTCHER CREEK LITTLE ROCKY	17,260 2,620 930 3,100
C	COOKE CITY LINE CREEK MEYER CREEK PALISADES STILLWATER PICKET PIN	5,890 10,490 280 810 940 2,070

MANAGEMENT AREA	MANAGEMENT AREA NAME	ACREAGE
D	BUTCHER CREEK	1,890
	FISHTAIL	11,850
	LINE CREEK	11,700
	PALISADES	1,370
	PICKET PIN	23,250
E	STILLWATER	26,560
F	BASIN	50
	CASCADE	30
	EAST ROSEBUD	2,010
	WEST ROSEBUD	2,610
	GRIZZLY PEAK	1,870
	PALISADES	20
	ROCK CREEK	2,600
	WOODBINE	310
G	FISHTAIL	4,310
	RED LODGE CREEK	4,170
P	MEYERS CREEK	280
	ROCK CREEK	80
R	WEST FORK ROCK CREEK	18,030
T	GLACIER LAKE	320
	SCENIC BYWAY	20,410
TOTAL - 9 MA GROUPS	31 MAs (DECISION AREA)	178,110

Features Common to All Alternatives

Although different in many respects, all of the action alternatives contain some common features. These are presented first to reduce the length and redundancy of later descriptions of the individual alternatives.

1. Intermingled Ownership Patterns

The Forest Service does not have administrative control over activities on nonfederal surface or nonfederal minerals simply because these areas fall within the analysis area boundaries. Federal management control varies between Federal and nonfederal ownership. Activities on nonfederal surface (split estate) that result from Federal oil and gas leases can be managed to some extent by the Forest Service and the BLM. Such leases can be offered with special restrictions, guidelines, or stipulations that would apply to the leased oil and gas operations and the potential lease purchaser would have to agree to abide by the Federal lease guidelines prior to issuance. A private owner may request additional restrictions on the lessee beyond those found in the Federal lease.

2. Mitigation on Existing Federal Leases

Existing Federal leases issued prior to the 1987 Forest Plan were issued under the Beartooth Unit Plan, which provides for resource mitigation, and are also under the standard lease terms. These leases cannot be changed administratively to add new stipulations or other requirements. Industry has generally been willing to accept and voluntarily implement new environmental mitigation measures even though the measures are not part of existing leases. The mitigation described under each alternative as well as any additional mitigation measures will be applied to new leases only.

The terms of the lease are management controls over the oil and gas activities resulting from the lease. Under standard lease terms, the Federal lessor has the authority to require modifications in the siting and design of facilities, control the rate of development and the timing of activities, as well as to require other mitigation measures to protect threatened and endangered species or objects of historic or scientific interest. The Federal lessor can require relocation of proposed operations by up to 200 meters (656 feet), or approximately 0.12 mile, and delay activities for up to 60 days at a time. See

Appendix E, Form 3100-11, "Standard Lease Terms and Conditions."

3. Mitigation Available for New Leases

A stipulation is a provision that modifies standard lease rights and is attached to and made a part of the lease. All stipulations comply with the Uniform Format for Oil and Gas Leasing Stipulations, as standardized in March, 1989 by the Rocky Mountain Regional Coordinating Committee. The Uniform Format was formally incorporated into the Forest Plan by amendment Number 1, March 29, 1991.

See Appendix E for full discussion and specifics on stipulations by alternative and management area.

Threatened, endangered, and sensitive species, cultural and historic resources, wilderness, floodplains, and wetlands are examples of resources that receive protection by law, regulation, or policy. Most of these resources receive consistent treatment in all alternatives. In limited situations there may be a variation to allow for analysis of effects and represent the character of the alternative. In any case, the agency will comply with the intent of the law and provide for required mitigation.

In situations where the resource is known, the normal preference is for avoidance of disturbing activity. Where suspected but unknown or large habitats may exist, the lease may contain a Lease Notice (LN) that alerts the lessee that restrictions may be needed beyond those revealed in the lease to provide mitigation for endangered or threatened species that may be present but are not yet inventoried.

Conditions of Approval that provide mitigation measures may be applied at the Application for Permit to Drill (APD) stage. Examples are detailed in Appendix D. These mitigation measures would be applied only if the NEPA analysis conducted at that time shows a need. They are not addressed by the alternatives in this analysis.

4. Greater Yellowstone Area

The Beartooth Mountains portion of the Beartooth Ranger District is a part of the Greater Yellowstone Area that encompasses Yellowstone Park and a number of other surrounding National Forests. The Greater Yellowstone Area is nationally known for its scenic beauty and wildlife, and public interest in the area is high. The analysis area is the northeasternmost portion of this area, consequently any proposal that is considered is of interest to some publics.

5. Areas Excluded from Further Study.

Areas excluded from study under the EIS are shown on the general area map in Chapter 1 as areas outside the decision area boundary. The areas exempt from study are the 339,841 acre Absaroka-Beartooth Wilderness (Management Area I). Management Area H lands (recommended Wilderness) of 5,866 acres is also excluded, per the Forest Plan Record of Decision. For this reason, the issue of Wilderness is not carried forward into Chapter 4 section on environmental consequences.

6. Reasonably Foreseeable Development Scenario (RFD)

The basis for estimating effects of oil and gas activities is the Reasonably Foreseeable Development (RFD) scenario. The RFD includes an estimate of the number of oil/gas wells that are likely to be drilled within the project are over the next 15 years, and the amount of disturbance taht would occur under typical drilling operations for the projected number of wells. The unconstrained RFD (Appendix A) projects four wells in the decision area over the next 15 years. The projection also concluded taht none of these wells would produce commercial quantities of oil or gas. This part of the RFD incorporates the best historical oil and gas development information and geologic datathat has been interpreted by BLM and FS geologists.

In addition, the RFD for this analysis projects locations for these four wells and also projects that one of these wells would be a discovery that would result in the development of a procucing location. These locations and the prognosis of a discovery well are purely hypothetical as a means to model the effects of oil and gas exploration and production. The main intent of this modeling is to seriously consider, prior to the leasing decision, the impact that would result from development, if these activities should occur within the next 15 years. The location of these wells and the discovery well are not presented to dictate where drilling sites are permissable or even likely to occur. This part of the RFD is based on oil and gas occurrence and potential maps found in Appendix A and the topographic features of the area. These factors were considered by FS geologists in selecting the sites.

Locations of four hypothetical well sites are shown on the maps in Appendix B. Assumptions for each well site are summarized in Table B.1 in Appendix B.

Stipulations applied at the leasing stage are detailed in Appendix E. Mitigation to be applied at the Application for Permit to Drill stage are detailed in Appendix D. However, until a Plan of Operation is analyzed, it is not possible to specifically state which mitigation measures may actually be needed. This would be determined by the NEPA analysis prepared for the APD.

Alternative Descriptions

The leasing alternatives attempt to meet, either wholly or partially, the purpose and need for the proposed action in 1.1 and address the issues identified in 2.1.2. These alternatives consider options ranging from no new leasing of administratively available lands (Alternative 1) to leasing all administratively available lands using primarily standard lease terms (Alternative 5). Alternatives 2, 3, and 4 reflect varying combinations of stipulations to clearly define and further address the issues. Alternative 4A was developed in response to public comments on the draft EIS.

Following are summary descriptions of the leasing alternatives analyzed in Chapter 4. Alternative maps 1 through 7, Appendix G, show spatial arrangement of stipulations in combinations with resources to help the reader gain an understanding of each alternative. Table 2.4 displays the stipulations applied by management area and resource by alternative for comparison purposes.

TABLE 2.4

Stipulations by Management Area, Resource, and Alternative

	ALTERNATIVES					
MANAGEMENT AREA	1	2	3	4	4A	5
High Hazard & Fragile Soils						
B; C; D; E; G	NL	NSO	NSO	NSO	NSO	ST**
C* Stillwater; C* Cooke City	NL	NSO	NSO	NSO	NL	ST**
D* Line Creek; R W Fork Rock Creek; T Scenic Byway	NL	NL	NSO	NSO	NA**	ST**
T Glacier Lake	NL	NL	NSO	NSO	NSO	ST**
Sensitive Plant Sites						
D Line Creek; T Scenic Byway	NL	NSO**	NSO**	LN	NA**	LN
F East Rosebud	NL	NSO**	NSO**	LN	NA**	LN
Sensitive Plant Habitat						
B; C; D; E; G; P	NL	LN	LN	LN	LN	LN
C* Cooke City	NL	LN	LN	LN	NL	LN
D* Line Creek; T Scenic Byway; F; R	NL	LN	LN	LN	NA**	LN
Riparian						
B; C; E; G	NL	NSO	NSO	NSO	NSO	ST**
P; T; C* Picket Pin; C* Palisade; C* Line Creek	NL	NSO	NSO	NSO	NSO	NSO
C* Stillwater; C Cooke City	NL	NSO	NSO	NSO	NL	NSO
F; R; D* Line Creek	NL	NSO	NSO	NSO	NA**	NSO
Yellowstone Cutthroat Trout						
(Presumed)						
B Little Rocky; G Red Lodge	NL	LN	LN	LN	LN	LN
C Cooke City	NL	LN	LN	LN	NL	LN
F Woodbine; T Scenic Byway	NL	LN	LN	LN	NA**	LN
(Verified)						
B Bad Canyon	NL	NSO	NSO	NSO	NSO	ST

MANAGEMENT AREA	1	2	3	4	4A	5
Golden Eagle Nest Sites						
B Little Rocky; C Line Creek; E Stillwater	NL	NSO 1 MI	NSO .5 MI	NSO .25 MI	NSO .5 MI	NSO .25 MI
Prarie Falcon Nest Sites						
C Palisades	NL	NSO .5 MI	NSO .5 MI	NSO .25 MI	NSO .25 MI	NSO .25 MI
Grizzly Bear Habitat						
(MS 1)						
C Cooke City	NL	NL	NSO	NSO	NL	TL**
(MS 2)						
C Cooke City	NL	NSO**	TL	TL	NL	LN**
E Stillwater	NL	NSO**	TL	TL	TL	LN**
Elk Home Range						
(Winter/Spring)						
B Bad Canyon	NL	TL	TL	TL	TL	ST**
C Picket Pin	NL	NSO	NSO	NSO	NSO	TL**
C Line Creek	NL	NSO	NSO	NSO	TL**	TL**
D Picket Pin; P Meyers Crk; T Scenic Byway; B Black Butte	NL	NSO**	TL	TL	TL	ST**
D Line Creek	NL	NSO**	NSO**	TL	NA**	ST**
R West Fork Rock Creek	NL	NSO**	TL	TL	NA**	ST**
(Summer/Fall)						
B Bad Canyon	NL	TL	TL	TL	TL	ST**
C Line Creek	NL	NSO	NSO	NSO	TL**	TL**
D Line Creek	NL	NSO**	NSO**	ST	NA**	ST**
E Stillwater; B Butcher Creek; D Fishtail; G Fishtail	NL	NSO**	TL**	ST	TL**	ST
R West Fork Rock Crk; T Scenic Byway	NL	NSO**	TL**	ST	NA**	ST
B Little Rocky	NL	TL**	TL**	ST	TL**	ST
Bighorn Sheep Winter/Spring Range						
C Stillwater	NL	NL	NSO	NSO	NL	TL**
C Line Creek	NL	NSO**	NSO	NSO	TL**	ST**
D Fishtail; E Stillwater; G Fishtail	NL	NSO**	TL	TL	TL	ST**
D Line Creek	NL	NSO**	NSO**	TL	NA**	ST**
F Woodbine; T Scenic Byway	NL	NSO**	TL	TL	NA**	ST**
Moose Home Ranges						
(Winter/Spring)						
B Little Rocky; B Black Butte; B Butcher Creek; D Picket Pin; D Palisades; E Stillwater; G	NL	NSO**	TL**	ST	TL**	ST
C Palisades	NL	NSO	NSO	NSO	NSO	TL**
F East Rosebud	NL	NSO**	TL**	ST	NA**	ST
(Summer/Fall)						
B Little Rocky; D Fishtail	NL	NSO**	TL**	ST	ST	ST
F West Rosebud	NL	NSO**	TL**	ST	NA**	ST
Mountain Goat Yearlong Home Ranges						
B Black Butte	NL	NSO**	TL**	ST	ST	ST
C Line Creek	NL	NSO**	NSO**	ST	ST	ST
D Line Creek	NL	NSO**	NSO**	ST	NA**	ST

MANAGEMENT AREA	1	2	3	4	4A	5
Mule Deer Winter/Spring Range						
B Bad Canyon	NL	TL**	TL**	ST	ST	ST
Visuals						
(Slopes >40%)						
B; C; D; E; G	NL	NSO	NSO	NSO	NSO	ST**
C* Line Creek	NL	NSO**	NSO**	ST	NSO**	ST
D* Line Creek	NL	NSO	NSO	NSO	NA**	ST**
T Scenic Byway	NL	NL	NSO	NSO	NA**	CSU**
T Glacier Lake	NL	NL	NSO	NSO	NSO	CSU**
Recreation Setting						
F Rock Creek; F West Rosebud; F East Rosebud						
F Grizzly Peak	NL	NSO**	TL**	ST	NA**	ST
(Buffer surrounding mgmt. area)		.25 CSU	.25 CSU	.25 CSU		
Visual Corridors						
(Buffer developed from Recreation Setting)						
B Black Butte; D Fishtail; D Butcher Crk;						
T Scenic Byway	NL	CSU	CSU	CSU	CSU	ST**
Developed Campground						
(Sites)						
F	NL	NSO	NSO	NSO	NA**	NSO
F* Rock Creek	NL	NL	NSO	NSO	NA**	NSO
(Buffer surrounding campground site)			.25 MI TL	.25 MI TL		
Wild Bill Picnic Area						
R West Fork Rock Creek	NL	NSO**	CSU**	ST	NA**	ST
Red Lodge Ski Area						
F Grizzly Peak	NL	NSO**	NSO**	ST	NA**	ST
Recreation Residents & Organizational Camps						
R West Fork Rock Creek	NL	NSO**	ST	ST	NA**	ST
T Scenic Byway	NSO	NSO**	ST	ST	NA**	ST
Vista Point						
(Site)						
T	NL	NSO**	NSO**	ST	NA**	ST
(Buffer)						
T		TL .25 MI				

MANAGEMENT AREA	1	2	3	4	4A	5
Trails						
B Bad Canyon	NL	CSU**	CSU**	ST	ST	ST
F; T Scenic Byway; D Line Creek	NL	NSO**	TL**	ST	NA**	ST
C Cooke City	NL	NSO**	TL**	ST	NL	ST
C Picket Pin	NL	NSO**	CSU**	ST	ST	ST
C Line Creek; D Picket Pin; T Glacier Lake	NL	NSO**	TL**	ST	ST	ST
D Palisades	NL	TL**	CSU**	ST	ST	ST
E Stillwater; G Fishtail	NL	CSU**	CSU**	ST	ST	ST
Roadless						
B Bad Canyon; E; G; F	NL	NSO**	ST	ST	ST	ST
B Black Butte; C Picket Pin; C Line Creek; D	NL	NSO**	NSO**	ST	ST	ST
C Stillwater; C Cooke City	NL	NSO**	NSO**	ST	NL	ST
R West Fork Rock Creek; T Scenic Byway	NL	NSO**	NSO**	ST	NA**	ST
F* Grizzly Peak; F* West Rosebud	NL	NSO**	NSO**	ST	NA**	ST
D* Line Creek	NL	NL	NSO**	ST	NA**	ST
Recreation Rivers						
B Black Butte; R West Fork Rock Creek	NL	TL**	CSU**	ST	ST	ST
E Stillwater	NL	CSU**	CSU**	ST	ST	ST
F East Rosebud; F Cascade; F Basin; F Rock Creek	NL	NSO**	TL**	ST	NA**	ST
Facilities						
P	NL	NSO	NSO	NSO	NSO	ST**
Municipal Watershed						
R	NL	NL	NSO**	NSO->30% CSU-<30%	NA**	CSU**
Cultural						
(Site)						
B; C; D; P	NL	NSO	NSO	NSO	NSO	NSO
C* Stillwater	NL	NSO	NSO	NSO	NL	NSO
R West Fork Rock Creek	NL	NSO	NSO	NSO	NA**	NSO
(Buffer .25 MI)						
B; C; D; P	NL	NSO	NSO	NSO	NSO	CSU**
C* Stillwater	NL	NSO	NSO	NSO	NL	CSU**
R West Fork Rock Creek	NL	NSO	NSO	NSO	NA**	CSU**

* Stipulations of specific management areas that differ from the general stipulation applied to the management areas as a whole. Refer to Appendix E for further details.

** Does not meet or exceeds current Forest Plan Standards, therefore an amendment would be required.

NOTE: All Management Area C's would be NSO for Alternatives 2, 3, 4. However, for Alternative 4A an NSO would apply to Management Areas C Meyers Creek; C Picket Pin; and C Palisades and an NL for C Stillwater and C Cooke City.

Alternative 1

Availability Alternative B is used in conjunction with this leasing alternative.

This alternative responds to the "No Action" requirement of Federal Regulations 40 CFR 1502, which is the No Leasing requirement of 36 CFR 228 (E), and to public comments received during the scoping period. The alternative forms the base to compare all of the action alternatives and highlights the differences between allowing no new leases and other action alternatives which allow new leases. It displays effects from all other activities within the decision area exclusive of oil and gas activities. It incorporates the most stringent mitigation measures to protect the surface and sub-surface environments short of not making the lands available or withdrawing from mineral entry.

Under this alternative there would be:

- **No new leasing** of the available 178,110 acres of National Forest System lands, and;

- Current leases on approximately 46,000 would be allowed to expire or terminate between now and approximately 1998 unless held by active exploration or production. These currently leased areas would not be reoffered for new leases.

No amendment to the Forest Plan would be required to implement this alternative. Availability of lands for leasing, as determined in the Forest Plan Record of Decision, does not obligate the responsible official to offer those lands for lease.

None of the four hypothetical well sites discussed in the RFD scenario (Appendix A and B) will be analyzed because leasing and subsequent occupancy are precluded in this alternative.

Alternative 2

See Table 2.4 and Alternative Maps 1 through 7 in Appendix G.

Availability Alternative B is used in conjunction with this leasing alternative.

This alternative emphasizes limiting activity that might affect wildlife, recreation, or other resources or uses in the area. Only minimum areas are available for oil and gas exploration and any subsequent development. Mitigation measures (that is, determined stipulations that will be imposed) are identified to minimize impacts to the potentially-affected resources.

For purposes of analyzing potential effects, no hypothetical well sites from the RFD scenario will be included. See Table 2.6.

To implement this alternative, the Forest Plan would require amendment.

Alternative 3

See Table 2.4 and Alternative Maps 1 through 7 in Appendix G.

Availability Alternative B is used in conjunction with this leasing alternative.

This alternative forms a transition between the most restrictive leasing alternative (2) and the Forest Plan alternative (4). It is similar to Alternative 4 except that it incorporates new information not available when the Forest Plan Record of Decision was signed (e.g., data on moose, goats, eagles, and etc.). Stipulations applied in this alternative allow comparison with the Forest Plan in specific areas and either confirm the stipulations applied in the Plan or demonstrate that conditions and/or information have changed that may require a Plan amendment.

For purposes of analyzing potential effects, two hypothetical well sites from the RFD scenario will be included. See Table 2.6.

This alternative would require amendment to the Forest Plan.

Alternative 4

See Table 2.4 and Maps 1 through 7 in Appendix G.

Availability Alternative B is used in conjunction with this leasing alternative.

Alternative 4 incorporates the desired future condition and goals for each management area and proposes leasing of specific lands using the standards, guidelines, and stipulations approved in the Forest Plan and Record of Decision (1987).

For purposes of analyzing potential effects, four hypothetical well sites from the RFD scenario will be included. See Table 2.6.

This alternative does not require amendment to the Forest Plan.

Alternative 4A

See Table 2.4 and Alternative Maps 1 through 7 in Appendix G.

Availability Alternative B1 is used in conjunction with this leasing alternative.

This alternative uses Alternative 4 as a starting point and makes some changes in resource direction to address certain key issues identified in the analysis process and the comments to the draft EIS. It also incorporates a change from the other alternatives in the definition of what activities would be covered by the NSO stipulation. Under this alternative, the NSO stipulation would be written to disallow all facilities associated with the exploration and development of the oil and gas resource and not just the well pad and drill site as defined in the Forest Plan. This means that road, pipeline and powerline development, as well as the well pad and ancillary facilities, would not be allowed by the lessee under this stipulation.

For purposes of analyzing potential effects, two hypothetical well sites from the RFD scenario will be included. See Table 2.6.

Implementing this alternative would require amending the Forest Plan.

Alternative 5

See Table 2.4 and Alternative Maps 1 through 7 in Appendix G.

Availability Alternative C is used in conjunction with this leasing alternative.

All 178,110 acres of administratively available lands are proposed for lease using standard lease terms and stipulations. Some Forest Plan constraints are removed. However, this alternative is not totally unconstrained. This alternative represents the least restrictive stipulations proposed and helps to define a clear justification for the level of stipulation chosen in the final decision.

For purposes of analyzing potential effects, four hypothetical well sites from the RFD scenario will be included. See Table 2.6.

This alternative would require amendment to the Forest Plan.

Summary of Alternatives

Table 2.5 provides a summary of acreage based upon the application of stipulations as mapped in Appendix G, Maps 1 through 7. These acres are the result of combining all of the stipulations. Doing this results in what the IDT referred to as "trumping". This simply means that a resource shown in table 2,4 that may only require a seasonal TL stipulation could be within the area of influence of another resource that requires NSO. The more restrictive yearlong stipulation is the one that shows on the map and generates the acreage. That resource requiring only TL actually receives a NSO stipulation level of protection. Similarly, if a Mangement Area is made not available or not leased for one major resource, all of the other resources are recipiants of the increased protection. Details of these combinations are shown in Chapter 4 Tables 4.5 through 4.11 in Chapter 4.1 for the entire area and for each Management Area in Table 4.12 through 4.20 in Chapter 4.2.

TABLE 2.5
Summary of Stipulation Acreage by Leasing Alternative

	ALT. 2		ALT. 3		ALT. 4		ALT. 4A		ALT. 5	
STIPULATION	ACRE	%	ACRE	%	ACRE	%	ACRE	%	ACRE	%
No Lease	53,800	30	-0-	0	-0-	0	6,840	4	-0-	0
No Surface Occupancy	107,030	60	147,720	83	135,590	76	85,810	48	6,510	4
Timing Limitation	200	<1	9,980	6	4,310	2	12,700	7	11,270	6
Controlled Surface Use	1,600	<1	1,630	<1	2,330	1	30	<1	20,780	12
Timing Limitation/ Controlled Surface Use	-0-	0	-0-	0	-0-	0	470	<1	-0-	0
Standard Terms	14,620	8	17,920	10	35,020	20	18,380	10	139,550	78
Total Available Area	177,250		177,250		177,250		124,230		178,110	

Source: Forest Service data compiled by the GIS system using rastor generated areas.

The following pie charts display the proportionate number of acres by stipulation by alternative. Proportionate areas displayed are based on the acres in Table 2.5.

Figure 2.1

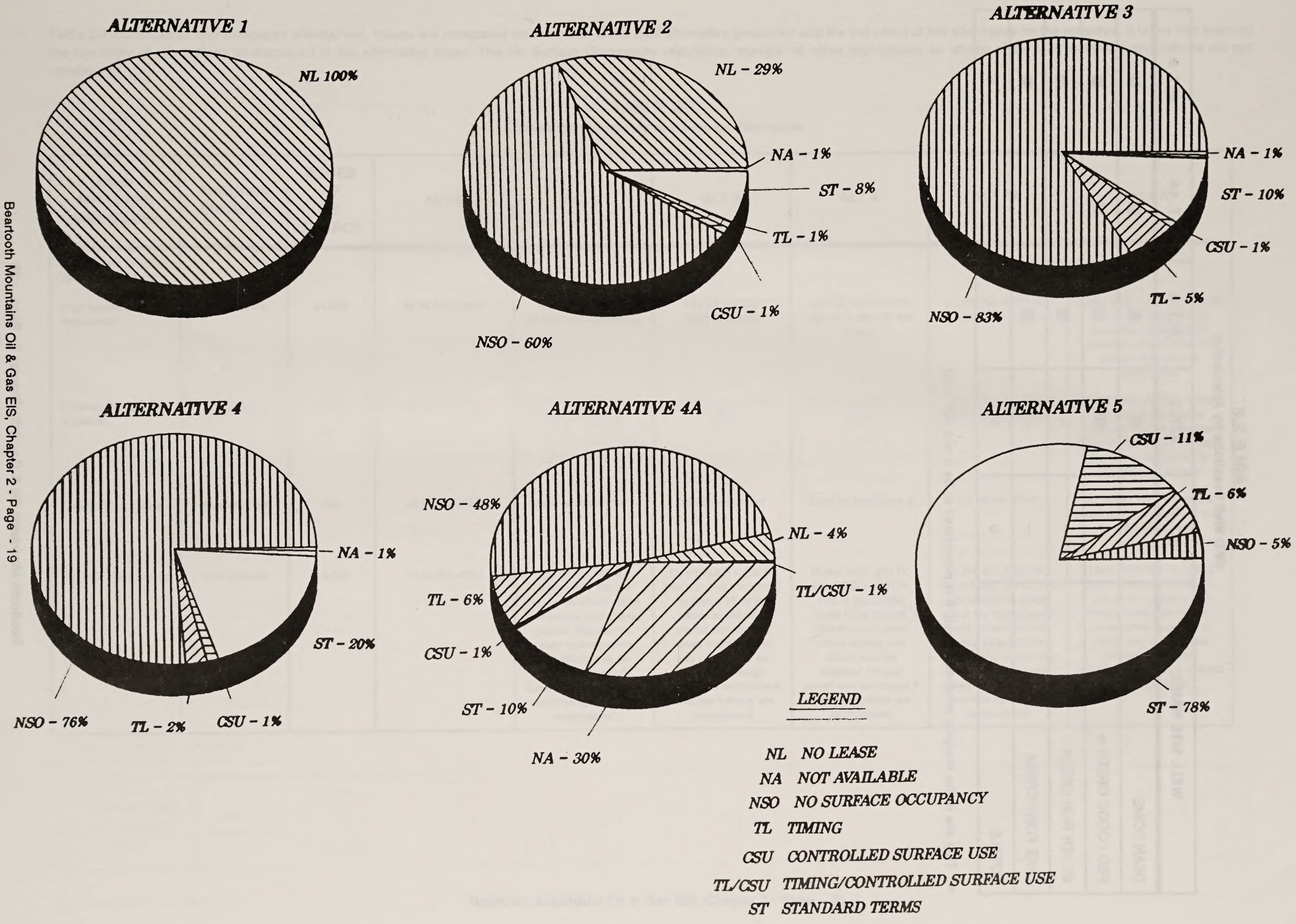

ALTERNATIVE 1
NL 100%
ALTERNATIVE 2
NL - 29%
NA - 1%
ST - 8%
TL - 1%
CSU - 1%
NSO - 60%
ALTERNATIVE 3
NA - 1%
ST - 10%
CSU - 1%
TL - 5%
NSO - 83%
ALTERNATIVE 4
NA - 1%
ST - 20%
NSO - 76%
TL - 2%
CSU - 1%
ALTERNATIVE 4A
NSO - 48%
NL - 4%
TL/CSU - 1%
TL - 6%
CSU - 1%
ST - 10%
NA - 30%
ALTERNATIVE 5
CSU - 11%
TL - 6%
NSO - 5%
ST - 78%
LEGEND
NL NO LEASE
NA NOT AVAILABLE
NSO NO SURFACE OCCUPANCY
TL TIMING
CSU CONTROLLED SURFACE USE
TL/CSU TIMING/CONTROLLED SURFACE USE
ST STANDARD TERMS

TABLE 2.6
RFD Well Locations by Alternative

WELL SITE NAME	ALT. 2	ALT. 3	ALT. 4	ALT. 4A	ALT. 5
DEAN DOME	–	■	■	■	■
RED LODGE CREEK ●	–	■	■	■	■
SILVER RUN CREEK	–	–	■	–	■
LAKE FORK CREEK	–	–	■	–	■
TOTALS	0	2	4	2	4

● This site is the analysis production well. It is considered to be a one well field.

Table 2.7 summarizes and compares alternatives. Issues are compared on the basis of the total alternative proposed and the net effect of the alternative on the resource. It takes into account the hierarchy of stipulations as displayed in the alternative maps. The No Surface Occupancy stipulation "trumps" all other stipulations, so effects of the less restrictive stipulations are not considered.

TABLE 2.7

Comparison Summary of Issues by Alternative

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
SOILS, AIR, WATER AND VEGETATION								
High hazard and fragile soils	Area affected	94,080	All NL-No Effects	120 NA; 24,490 NL; 69,470 NSO-No effects	120 NA; 93,960 NSO-No effects	120 NA; 90,700 NSO; 280 TL; 2,980 ST- No effects	27,930 NA; 5,230 NL; 60,920 NSO- No effect	2,690 NSO; 4,210 TL; 16,010 CSU; 71,170 ST- 73% of these soils could receive Increased surface runoff and erosion from ground disturbance
Riparian/floodplains/ wetlands	Area affected	8,650	All NL-No Effect	40 NA; 2,030 NL; 6,580 NSO- No effect	40 NA; 8,610 NSO- No effect	40 NA; 8,610 NSO-No effect	2,080 NA; 1,110 NL; 5,280 NSO- No effect	5,730 NSO; 20 CSU; 3,080 ST- 33% of the riparian resource could experience ground disturbance. A Lease Notice will be applied to mitigate by avoidance
Sensitive Plant Sites	Area affected	30	All NL-No effect	Same as Alternative 1	All NSO-No effect	Same as Alternative 3	All NA-No effect	All known sites will have a lease notice applied and may be mitigated through avoidance
Sensitive Plant Habitat	Area affected	18,740	All NL-No effect	10,790 NL; 120 NA; 7,680 NSO; 150 LN- Mostly no effect; 1% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	17,370 NSO; 1,200 TL; 60 CSU; 110 LN- Mostly no effect; 1% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	15,930 NSO; 270 TL; 870 CSU; 1,670 LN- 15% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	11,940 NA; 2,120 NL; 4,210 NSO; 120 TL; 220 LN- Mostly no effect; 2% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered	1,290 NSO; 840 TL; 3,680 CSU; 10,820 LN; 2,030 ST- 93% of the habitat could have ground disturbance. Lease notice applies and effects may be mitigated through survey and avoidance if sensitive species are encountered

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
THREATENED, ENDANGERED AND SENSITIVE SPECIES								
Bald Eagle (TE)	Disturbance surrounding nest sites	-0-	Ground disturbances precluded, entire decision area NL-No Effect	No bald eagle nest in the decision area; all MA's will receive a Lease Notice-No Effect	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Golden Eagle	Disturbance surrounding known nest sites	4,380 within 1 mi radius	Ground disturbances precluded, entire decision area NL-No Effect	All NSO-No Effect	1,290 NSO; 3090 ST- May be some effects to one or more nest sites	920 NSO; 370 TL; 3090 ST- May be some effects to one or more nest sites	Same as Alterative 3	510 NSO; 3870 ST- May adversely affect one or more nest sites
Peregrine falcon (TE)	Disturbance surrounding nest sites	-0-	Ground disturbances precluded, entire decision area NL-No Effect	No known peregrine falcon nest exist within the decision area, all MA's with potential habitat will receive a Lease Notice-No Effects	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Gray wolf (TE)	Potential habitat affected	30,310	Ground disturbances precluded, entire decision area NL-No Effect	All MA's which contain potential habitat would receive a Lease Notice	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Grizzly Bear (TE) - MS 1	Habitat affected	2,740	All NL-No effect	Same as Alternative 1	All NSO; Lease Notice also attached-No effect	Same as Alternative 3	Same as Alternative 1	660 NSO; 2,080 TL- May have adverse effect
Grizzly Bear (TE) - MS 2	Habitat affected	4,360	All NL-No effects	All NSO-No effects	Same as Alternative 2	Same as Alternative 2	2,890 NL; 1,470 NSO - No effects	380 NSO; 3,980 ST- May have adverse effect
Yellowstone Cutthroat Trout (S)	Changes in water quality	210	Ground disturbances precluded-No effects	310 NL; 300 NSO; 60 LN	530 NSO; 70 TL; 70 LN- LN would result in application of measures adequate for protection of this species	340 NSO; 120 TL; 70 CSU; 140 LN- LN would result in application of measures adequate for protection of this species	240 NA; 210 NL; 90 NSO; 50 TL; 80 LN- LN would result in application of measures adequate for protection of this species	180 NSO; 10 TL 220 CSU; 260 LN- LN would result in application of measures adequate for protection of this species

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
BIG GAME AND OTHER SPECIES								
Elk	Winter/spring range affected	13,150	All NL-No effect	800 NA; 4,860 NL; 7,440 NSO; 50 TL-No effect	800 NA; 11,420 NSO; 930 TL-No effect	800 NA; 11,100 NSO; 1,250 TL-No effect	3,800 NA;6,440 NSO; 2,910 TL-No effect	11,840 NSO; 1,130 TL; 180 ST- Some displacement anticipated
	Summer/fall range affected	26,150	All NL-No effect	8,390 NL; 17,570 NSO; 10 TL-No effect	21,150 NSO; 5,000 TL-No effect	17,080 NSO; 400 TL; 8,670 ST-Displacement anticipated on some herds	9,180 NA; 9,050 NSO; 7,920 TL-No effects	760 NSO; 4,380 TL; 2,980 CSU; 18,030 ST- Displacement anticipated on all herds
Bighorn sheep	Winter/spring range affected	11,210	All NL-No effect	4,860 NL; 6,350 NSO-No effect	10,900 NSO; 310 TL-No effect	10,380 NSO; 830 TL-No effect	3,440 NA; 640 NL; 6,490 NSO; 640 TL- No effect	570 NSO; 840 TL; 3,480 CSU; 6,320 ST- Displacement anticipated
Mule deer	Winter/spring range affected	1,870	All NL-No Effects	NSO 1,830 acres; TL 40 acres-No Effects	Same as Alternative 2	NSO 1,830 acres; TL 10 acres; ST 30 acres-Some displacement anticipated	Same as Alternative 4	ST 1,870 acres- Displacement anticipated
Moose	Winter/spring range affected	13,630	All NL-No effect	All NSO-No effect	8,330 NSO; 5,300 TL-No effect	5,800 NSO; 5,290 TL; 70 CSU; 2,470 ST-Displacement anticipated	500 NA; 5,980 NSO; 6,920 TL; 230 ST- No effect	730 NSO; 310 TL; 12,590 ST-Displacement anticipated
	Summer/fall range affected	1,170	All NL-No Effect	All NSO-NO Effect	NSO 850 acres; TL 320 acres- No Effect	NSO 830 acres; TL 20 acres; ST 320 acres-Some displacement anticipated	NA 430 acres; NSO 420 acres; ST 320 acres-Some displacement anticipated	NSO 70 acres; ST 1,100 acres- Displacement anticipated
Mountain goat	Yearlong range affected	4,170	All NL-No effect	All NSO-No effect	Same as Alternative 2	Same as Alternative 2	1,370 NA; 2,770 NSO; 30 ST- Some minor displacement anticipated for the Line Creek Herd	140 NSO; 2,600 TL; 1,430 ST- Displacement anticipated
AESTHETICS								
General visual re-source	Area Affected	73,780	All NL-No effect	480 NA; 21,970 NL; 51,330 NSO- No effect	480 NA; 73,300 NSO-No effect	Same as Alternative 3	16,840 NA; 56,940 NSO- No effect	960 NSO; 5,270 TL; 17,440 CSU; 50,110 ST- Outside of Scenic Byway, operations may be visible
Visual Corridors	Critical viewsheds affected	4,430	All NL-No effect	3,430 NL; 970 NSO- No effect	4,370 NSO; 30 TL; 30 CSU- No effect	3,880 NSO; 70 TL; 480 CSU- No effect	2,360 NA; 2,000 NSO; 20 TL; 30 CSU; 20 TL/CSU- No effect	60 NSO; 3,400 CSU; 970 ST-Some operations may be visible

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
RECREATION Developed camp-grounds	Area of campgrounds affected	310	All NL-No effect	170 NL; 140 NSO- No effect	All NSO-No effect	Same as Alternative 3	All NA-No effect	Same as Alternative 3
	Area of ¼ mi buffer affected	1,910	All NL-No effect	750 NL; 1,160 NSO- No effect	490 NSO; 1,420 TL- Operations may be seen or heard during the off-season	310 NSO; 1,600 TL- Operations may be seen or heard during the off-season	All NA-No effect	370 NSO; 1,540 ST- Increased possibility of operations being seen or heard from the campground
Trails	Area of ¼ mi buffer affected	30,640	All NL-No effect	80 NA; 12,820 NL; 16,160 NSO; 80 TL; 1,500 CSU- No effect	80 NA; 27,830 NSO; 1,130 TL; 1,590 CSU; 10 ST- Little to no effect	80 NA; 25,100 NSO; 800 TL; 900 CSU; 3,760 ST- Operations may be seen or heard in some areas	12,570 NA; 1-1770 NL; 13,210 NSO; 840 TL; 2,250 ST- Operations may be seen or heard in some areas	1,810 NSO; 3,600 TL; 6,980 CSU; 18,250 ST- Operations likely to be seen or heard where they occur near trails
Recreation rivers	Area of ¼ mi buffer affected	9,100	All NL-No effect	6,560 NL; 2,540 NSO- No effect	7,590 NSO; 1,400 TL; 110 CSU- Little to no effect	4,260 NSO; 1,470 TL; 1,220 CSU; 2,150 ST- Operations may be seen or heard from some river segments	7,370 NA; 1,080 NSO; 320 TL; 190 TL/CSU; 130 ST- Little to no effect	1,150 NSO; 4,220 CSU; 3,730 ST- Operations may be seen or heard from some river segments
Recreation residences and organizational camps	Area of sites affected	80	All NL-No effect	Same as Alternative 1	All NSO-No effect	20 NSO; 60 CSU- Some operations may be seen or heard, but views would not appear modified	All NA-No effect	80 CSU- Some operations may be seen or heard, but views would not appear modified
Wild Bill Picnic Area	Area of site affected	30	All NL-No effect	Same as Alternative 1	All NSO-No effect	20 NSO; 10 CSU- Some operations may be seen or heard, but views would not appear modified	All NA-No effect	Same as Alternative 4
Red Lodge Ski Area	Area of permitted area affected	220	All NL-No effect	All NSO-No effect	Same as Alternative 2	10 NSO; 210 ST- Some operations may be seen or heard from the ski area	All NA-No effect	Same as Alternative 4
CULTURAL RE-SOURCES Archaeological, histor-ical and cultural	Known and discovered sites affected	44 known sites	All NL-No effect	NL which would result in the application of measures adequate for protect of the sites	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2

MAIN FEATURES AND ISSUES	ANALYSIS CRITERIA	ACRES OF RE-SOURCE	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
ROADLESS AND WILDERNESS								
Roadless areas	Area of unroaded character affected	83,910	All NL-No effect	Same as Alternative 1	100 NA; 71,220 NSO; 2,190 TL; 10 CSU; 2,530 ST- Potentially 8% of the area could be affected	100 NA; 71,220 NSO; 2,020 TL; 1,250 CSU; 9,320 ST- Potentially 15% of the area could be affected	38,070 NA; 3,000 NL; 31,370 NSO; 4,040 TL; 20 CSU; 3,810 TL/CSU; 3,800 ST- Potentially 14% of the area could be affected	2,630 NSO; 4,830 TL; 28,800 CSU; 47,850 ST- Potentially 97% of the area could be affected
Wilderness	Area of wilderness character affected		No wilderness within decision area	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
QUALITY OF LIFE								
Municipal watershed-Red Lodge	Affects on water quality	18,090	All NL-No effect	Same as Alternative 1	All NSO-No effect	18,280 NSO; 1,800 CSU- Little to no effect	All NA-No effect	970 NSO; 17,090 CSU- Increased possible adverse effects
Air quality	Affects on air quality	RFD well locations occupied	All NL-No effects	No RFD sites occupied- No effects	2 RFD sites occupied- No cumulative effects	4 RFD sites occupied- Very minimal cumulative effects	Same as Alternative 3	Same as Alternative 4
ECONOMIC STABIL-ITY AND REVENUE								
Incomes-Federal	Bonus bids	1990 dollars	-0-	239,780	352,480	Same as Alternative 3	232,760	354,200
	Rentals and royalties	1990 dollars	-0-	179,820	305,040	Same as Alternative 3	215,250	306,330
Income-State	Bonus bids	1990 dollars	-0-	119,880	178,240	Same as Alternative 3	116,380	177,100
	Rentals and royalties	1990 dollars	-0-	89,910	152,520	Same as Alternative 3	107,625	153,165
Income-Counties	Bonus bids	1990 dollars	-0-	2,841	4,177	Same as Alternative 3	2,759	4,197
	Rentals and royalties	1990 dollars	-0-	2,131	3,615	Same as Alternative 3	2,551	3,630
Employment and Income	Effects on jobs	Number of new jobs	-0-	-0-	31-70	31-131	Same as Alternative 3	Same as Alternative 4
	Wages and salaries	Millions of 1990 dollars	-0-	-0-	$0.64-1.44	$0.84-2.71	Same as Alternative 3	Same as Alternative 4

TE - Threatened or endangered species under the Endangered Species Act (ESA).
S - Sensitive species defined by the Northern Region, USFS.

CHAPTER 3

THE AFFECTED ENVIRONMENT

CHAPTER 3

3.0 INTRODUCTION

This chapter describes the existing environmental, social, and economic conditions which may or may not be changed or affected by the alternatives described in Chapter 2. The descriptions focus on the affected environment within the Beartooth Mountains leasing decision area. The existing conditions of some resources, such as social/economics and wildlife, even if outside the actual decision area may be addressed if those resource conditions are potentially affected by the leasing decision. Resource reports for this analysis contain more detailed information than what is presented in this chapter. This was to provide a basis for the analysis of impacts to the various resource issues identified. These reports are part of the project file, and are available for review at the Custer National Forest Supervisor's Office in Billings, Montana.

Chapter 3 incorporates Forest-wide direction and land allocation decisions of the Custer National Forest Land and Resources Management Plan (1987). The Forest Plan provides management direction and constraints to the lands within the leasing decision area. The existing management direction found in Forest Plan Goals and Standards is a logical place to begin the discussion of the affected environment.

3.0.1 OIL AND GAS RESOURCES

The Forest Plan goal for minerals management is to be responsive to the national demand for energy and strategic minerals consistent with other resources objectives. The Forest is rich in energy resources and strategic minerals and is responding to the growing demand by making these products available for development. The plan recognizes that extraction of these mineral resources is important to the national public interest and in some areas their values will outweigh other resource values. This plan also recognizes that there are other areas where recreation, key wildlife habitat or other resources are important values in the same areas. In these situations measures will be taken to minimize adverse impacts to these values, or in a few cases, the area will not be available for mineral development (Forest Plan, 1987, pg. 3).

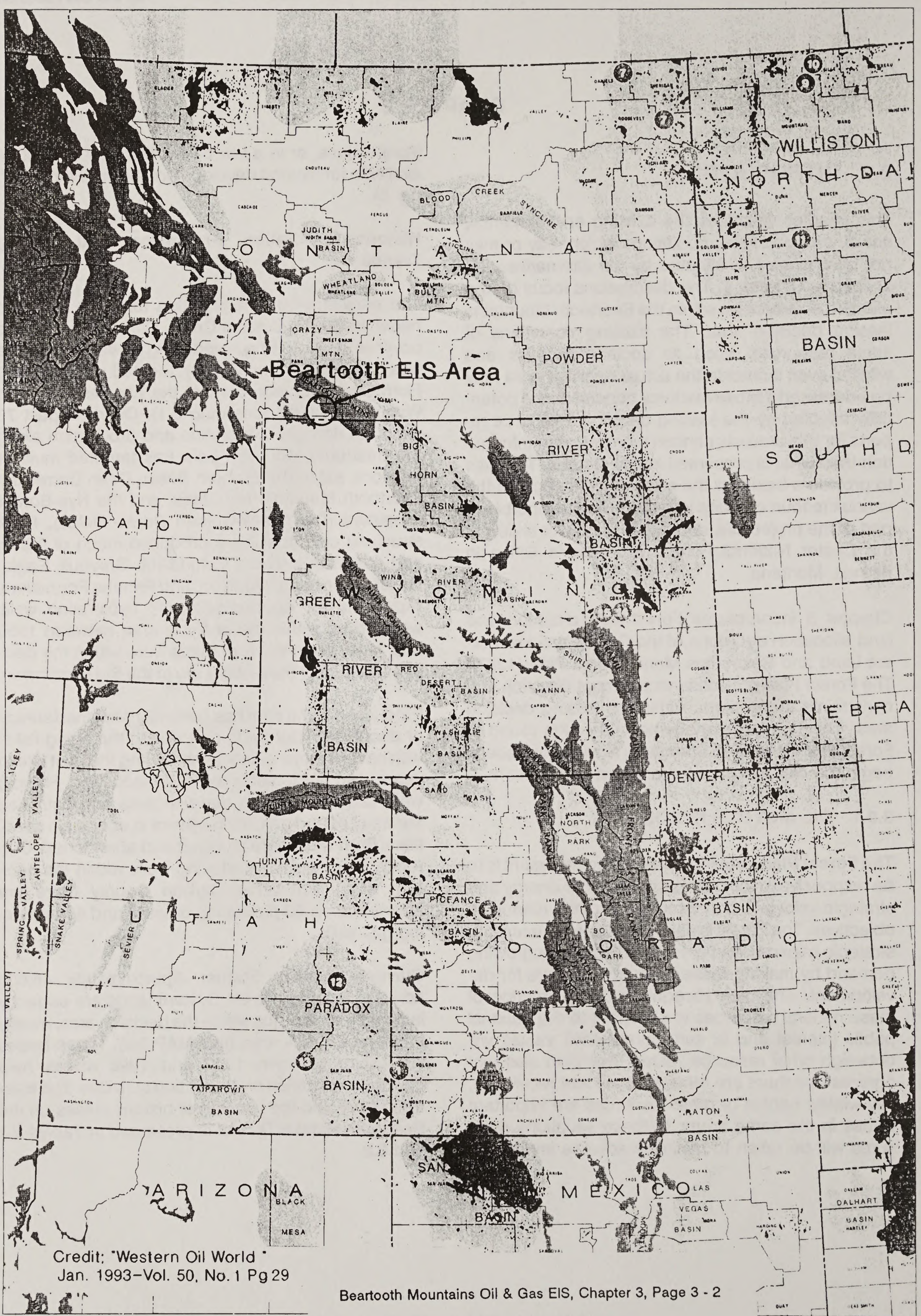
Historic Exploration, Production, and Leasing Trends

The earliest wildcat exploration for oil in Montana began in 1889 in Butcher Creek, Carbon County (see cover of FEIS). The first producing oil well in Montana was drilled in Carbon County, located within the Big Horn Basin, an extension of the Elk Basin Field in Wyoming in 1915 (see Map 3.1). Over the past 70 years, oil and gas exploration and production along the Beartooth Mountain front has targeted multiple horizons within the Bighorn Basin, Dean Dome, the Beartooth Mountain front fault, and the Nye-Bowler lineament (Dry Creek-Golden Dome Fields). Rock structural units that have produced much of the oil and gas in this region include the Greybull, Eagle/Virgelle, Tensleep, Madison, and Frontier Formations (Appendix A). Approximately 47 exploration wells were drilled within the analysis area between 1950 and 1990, but only six of these were within the decision area. All of these wells are in the Big Horn basin.

Production in the area has generally remained steady or decreased slightly, in part due to the aging fields with no new major discoveries. During the past fifteen years, two exploration wells (Amoco and Phillips) were drilled within the decision area and both had shows of oil and gas, although not in economic quantities. Both wells were plugged and abandoned. Currently, there are no producing wells within the decision area, but within Carbon County there are approximately 60 producing oil wells and 40 producing gas wells.

Current Leasing Status: Approximately 46,000 acres of National Forest System lands are currently leased for oil and gas within the decision area, mostly in the Line Creek area (see MAP 3.2). These leases will expire between 1992 and 1998 unless held through exploration or production activities. The leasing history and the location of historic leases on the Beartooth Ranger District is presented in Tables 3.1 and 3.2

Map 3.1 Major Oil Potential Areas in Western U. S.



Credit; "Western Oil World"
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Beartooth Mountains Oil & Gas EIS, Chapter 3, Page 3 - 2

Mineral Leases

Map 3.2

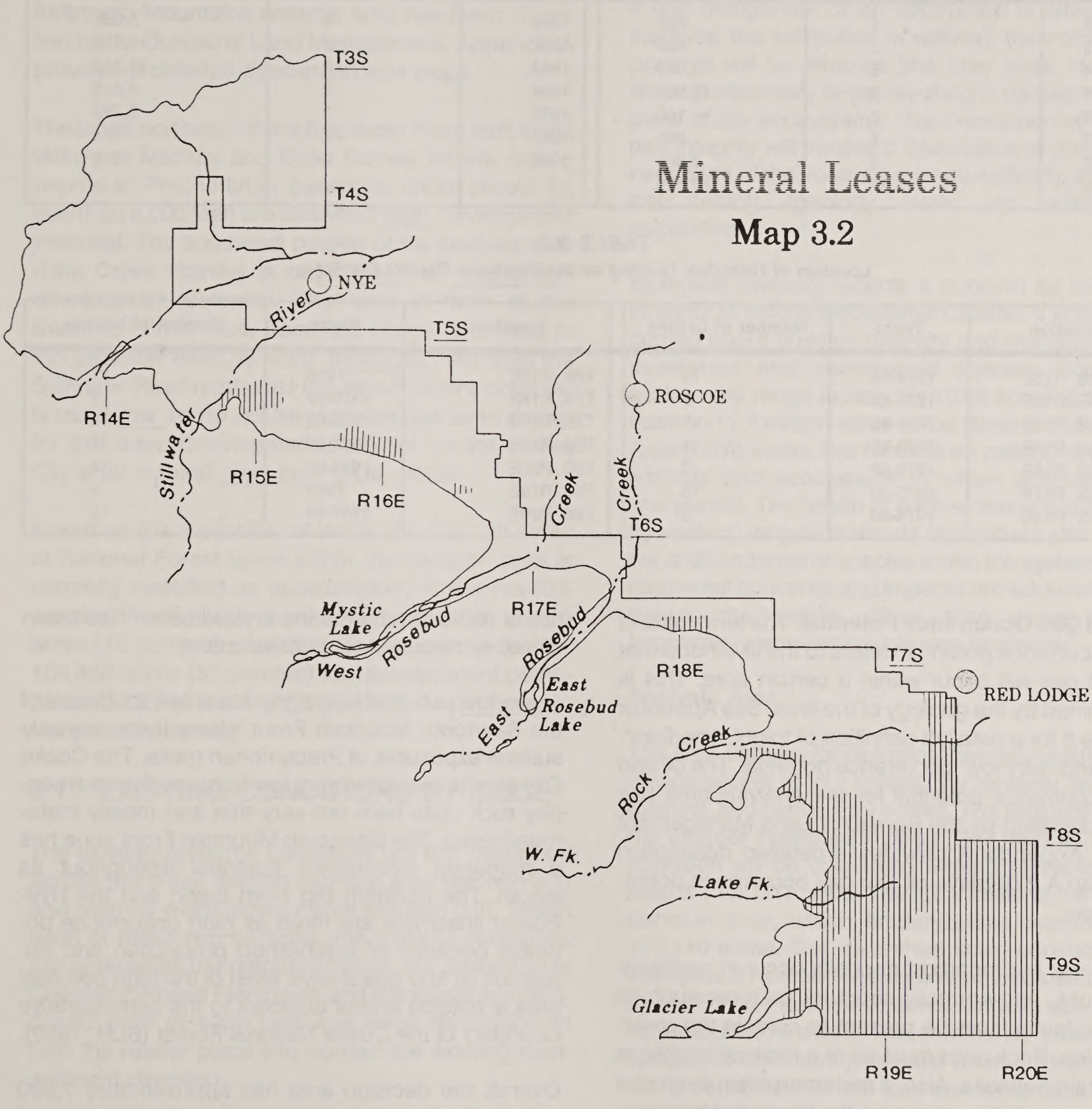


TABLE 3.1
Beartooth Ranger District Oil and Gas Leasing History (1969 - 1988)

Year Issued	Number of Leases	Acres	Year Issued	Number of Leases	Acres
1969	1	625	1980	4	5,360
1973	2	600	1982	16	10,798
1974	6	8,040	1983	12	25,015
1975	8	15,928	1984	6	4,518
1976	2	160	1985	8	5,795
1977	1	280	1986	2	174
1978	3	3,366	1988	2	642
1979	47	67,575			

TABLE 3.2
Location of Historical Leasing on the Beartooth Ranger District

Location	Years	Number of Leases	Location	Years	Number of Leases
T3S, R15E	1974-79	14	T7S, R17E	1985	1
T4S, R15E	1974-82	8	T7S, R18E	1979-85	8
T5S, R15E	1979-85	11	T7S, R19E	1979-82	10
T5S, R16E	1973-88	18	T8S, R19E	1979-80	11
T6S, R16E	1979-82	5	T8S, R20E	1974-80	13
T6S, R17E	1976-86	15	T9S, R19E	1983	4
T6S, R18E	1974-86	3	T9S, R20E	1969-84	10

Oil and Gas Occurrence Potential: The term "oil and gas occurrence potential" refers to the likelihood that oil and gas will occur within a certain area. This is determined by the geology of the area. See Appendix A, page 5 for a detailed definition of "high", "medium", "low", and "very low" occurrence potential. The oil and gas occurrence potential for the analysis area has been classified by the Bureau of Land Management (BLM). Appendix A provides a detailed description and Map A.2 displays oil and gas occurrence potential areas.

In general, hydrocarbon deposits occur in sedimentary rocks, and normally structural features such as folds or faults must be present to contain the reservoir fluids. Rock units must be of a minimal thickness to contain deposits. Also, if metamorphism even of a fairly low grade has occurred, the increased temperature and pressure that creates metamorphic rocks usually will drive off hydrocarbons. Therefore, oil and gas deposits occur in unmetamorphosed sedimentary rocks. Almost all rocks that are older than Cambrian (that is, are Precambrian in age) are somewhat metamorphosed. Extensively metamorphosed rocks or intrusive rocks such as granitics, and some extrusive volcanic rocks are referred to collectively as crystalline rocks (which means crystallization has taken place, as opposed to sedimentation).

A very low potential is assigned to areas southwest of the Beartooth Mountain Front where there are only surface exposures of Precambrian rocks. The Cooke City area is also rated very low because the sedimentary rock units here are very thin and mostly metamorphosed. The Beartooth Mountain Front zone has a moderate occurrence potential throughout its length. The northern Big Horn Basin and the Nye-Bowler lineament are rated as high occurrence potential because of established production and numerous oil and gas shows. Most of the high potential area is outside and/or adjacent to the administrative boundary of the Custer National Forest (BLM, 1992).

Overall, the decision area has approximately 7,900 acres of high occurrence potential, 105,830 acres of moderate occurrence potential, 23,110 acres of low occurrence potential, and 41,270 acres of very low occurrence potential.

Oil and Gas Development Potential: "Development potential" refers to the likelihood that if oil and gas deposits are discovered (that is, if they "occur"), that there will be sufficient quantity and that other necessary factors are present such that the deposits can be economically developed. See Appendix A, page 10 for a detailed description of "high", "moderate", "low", and "very low" development potential.

The oil and gas development potential for the Beartooth Mountains analysis area has been classified by the Bureau of Land Management. Appendix A provides a detailed description and maps.

The lands northeast of the Beartooth Front fault in the vicinity of Mackay and Dean Domes (where drilling depths to Precambrian basement rocks should be less than 8,000 feet) are classified high development potential. The southeast portion of the analysis area (Line Creek vicinity) is rated low to moderate development potential. The area in front of the Beartooth Front fault, from Red Lodge northwest to the Stillwater River, is rated moderate, but from the Stillwater River northwest the development potential is rated low as no industry interest has been shown for this area. Development potential for the Cooke City area is rated very low (BLM, 1992).

Based on the availability of lands, the 178,110 acres of National Forest lands within the decision area is currently classified as approximately 870 acres (0.5 percent) having high development potential, 30,470 acres (16 percent) moderate development potential, 109,430 acres (57 percent) low development potential, and 37,340 acres (26.5 percent) as very low development potential.

3.1 EXISTING CONDITIONS BY ISSUE

The existing resource conditions are first described across the entire leasing decision area (section 3.1) and then by management area (section 3.2). Within each of these two sections, the existing conditions are ordered as the resource issues are presented in Chapter 2. Forest Plan goals and standards are introduced prior to each resource issue discussion to help the reader place into context the existing management direction.

The Forest Plan decision of 1987 guides all natural resource management activities and establishes management direction and standards for all lands administered by the Custer National Forest. Forest wide direction applies equally across the entire Forest.

Ecosystem Integrity - Biological Diversity

An ecosystem is an interacting system of organisms considered together with their environment. Ecosystem integrity refers to maintaining the component parts of an ecosystem, and to the phenomenon that if one component of an ecosystem is affected (for instance, the extirpation of wolves), then other components will be affected (the prey base may grow disproportionately large, resulting in damage to other parts of the ecosystem). This discussion of ecosystem integrity will involve a description of the component parts of the ecosystem(s), specifically, the physical setting (geology, soils, air, water, and vegetation).

Biological diversity reflects a concern for biological integrity at different ecosystem scales. It is also concerned about species diversity and management of threatened and endangered species. Ecosystem scales may range in size from 326 acres at the RFD scale to 11.7 million acres at the Greater Yellowstone Area (GYA) scale. The focus is on maintaining viable habitats and ecosystems in which species evolve and persist. The health of such systems is monitored by tracking long-term trends of numbers and proportional abundance of species within the systems. Environmental concerns and impacts are addressed relative to the system rather than using a more fragmentary species-by-species approach.

Analysis Area

The analysis area for biological diversity existing conditions occurs at four scales: the regional, local, watershed, and community scales. The regional scale is the Greater Yellowstone Area (GYA and its existing condition will be discussed within this section. See Map 3.3 for GYA area. The local scale is the leasing decision area, which encompasses approximately 178,110 acres. The watershed scale consists of the individual 31 named management areas as outlined by the Forest Plan. These areas range in size from 20 acres to 27,910 acres. The community scale will be species or community-specific when addressing existing conditions for the four well sites discussed in Appendix B.

The existing condition of biological diversity is displayed by:

1) a description of existing vegetation and wildlife,

2) a description of threatened, endangered, and sensitive species (TES), and other rare or unique elements, and

3) a description of ecosystem attributes including species composition and structure, as well as the processes and functions which interact with them.

Further detailed information on biological diversity is portrayed in the Beartooth Oil and Gas Leasing Biological Diversity Report, Biological Evaluation for the Yellowstone Cutthroat Trout and Aquatic Resources Summary, Biological Evaluation for TES species, and in the wildlife technical report. All of these are found in the project file.

Regional Scale--Greater Yellowstone Area

The Greater Yellowstone Area (GYA) is traversed by the Continental Divide in the mountainous region of northwestern Wyoming, and adjacent parts of Montana and Idaho. Yellowstone National Park forms the core of the area. Grand Teton National Park and portions of six adjacent National Forests (Beaverhead, Custer, and Gallatin National Forests in Montana; Bridger-Teton and Shoshone National Forests in Wyoming; and the Targhee National Forest in Idaho) surround this core area. The contiguous portions of these Parks and Forests encompass roughly 11.7 million acres of Forest Service and BLM lands, plus state lands, National Wildlife Refuges, and other lands.

The Greater Yellowstone Area management plan states that the GYA is the largest wildland tract in the contiguous United States, where the original biota is essentially intact, and ecological and geological processes operate nearly as they have for the past 10,000 years. The rugged topography creates altitudinal gradients in close proximity to one another, and causes greater biological diversity than in a comparably sized area with less topographic variety. This topography also discouraged settlement or development and helped maintain the biological diversity present in the area today.

The immense size of the GYA supports large populations of each plant and animal species, encourages genetic variation, and avoids local extinctions. Natural disturbances and processes which continue to operate in such large areas foster a mosaic of successional communities across the landscape, and enhance biological diversity.

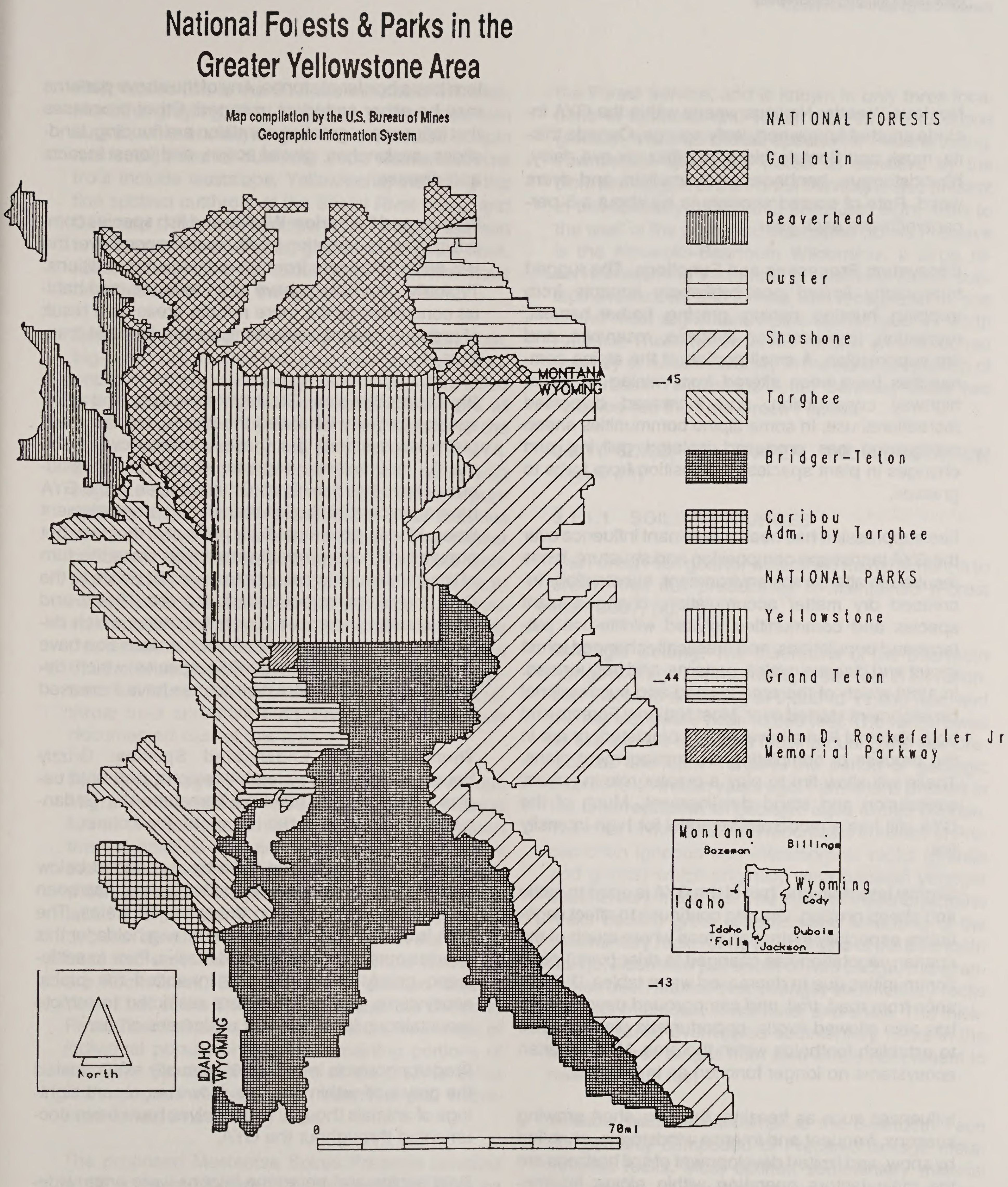
Geology: The geology of the GYA includes surficial deposits, basaltic flows, rhyolitic tuffs and flows, Paleozoic and Mesozoic sedimentary and metamorphic rocks, Precambrian, andesite and andesitic tuffs and flows, Tertiary volcanic extrusives, Cretaceous sandstones and shales, Tertiary metamorphic and sedimentary rocks, and granite igneous rocks.

Special and unique geologic features include water falls, hydrothermal explosion craters, springs, major slide areas, Two Ocean Pass, hot springs, rock glaciers, fault/dike/rock outcrops, obsidian cliffs, Hoodoo Rock formations, lava dome, caldera, and glaciers. The GYA also includes caves, natural bridges, petrified forests, earthquake areas, and the Grand Teton mountain range.

Soils: Soils are highly erodible soils and there is high potential for mass movement throughout the area.

General Vegetative Condition: Sixty percent of the GYA is forested, 38 percent is non-forested, and two percent is water. Major timber types are aspen, Douglas-fir, Engelmann spruce, lodgepole pine, and whitebark pine. Sub-alpine fir is intermixed with Douglas-fir and Engelmann spruce. Prior to 1988 the forest composition was shifting towards shade tolerant tree species in both the understory and overstory, while stand structures were becoming multiple canopy levels that shaded out understory grasses, forbs, and shrubs. Some forest communities, like aspen, were disappearing from the landscape. Patch sizes were increasing as similar forest types grew into the overstory layer creating large expanses of common stand structure that were not necessarily the same age. The numbers of forested patches decreased as similar forest types grew together and coalesced into single stands. Many grassland communities were dominated by sagebrush, shrubby cinquefoil, Douglas-fir, and limber pine. In 1988, large portions of the GYA burned, which opened up many of the stands, increased the understory vegetation, increased diversity of age and density within the stands, increased mosaic patterns, and in general returned ecological succession to an earlier stage.

Only ten percent of the trees in the GYA are currently scheduled for timber harvesting. Ninety percent of the forested lands will continue to be managed under more natural conditions, with insects, disease, and fire providing timber stand replacement and ecological succession.



SEPTEMBER 1991

Map 3.3 A Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area

Noxious Weeds: Noxious weeds within the GYA include spotted knapweed, leafy spurge, Canada thistle, musk and Scotch thistle, toadflax, ox-eye daisy, houndstongue, henbane, wooly mullein, and dyers woad. Rate of spread appears to be about a 5 percent increase each year.

Ecosystem Processes and Functions: The rugged topography limited post-settlement impacts from trapping, hunting, mining, grazing, timber harvest, recreation, transportation systems, reservoirs, and fire suppression. A small portion of the alpine communities have been altered from mining ventures, highway construction, and increased dispersed recreational use. In some alpine communities sheep overgrazing has produced isolated gullying and changes in plant species composition from forbs to grasses.

Fire suppression has been a dominant influence over the GYA landscape composition and structure. It has resulted in altered soil environment, substantially increased dry matter accumulation, changed plant species and communities, shifted wildlife-use patterns and populations, and drastically changed forest insect and disease cycles, patterns, and frequencies. In 1988 much of the area burned and successional development started over. Most National Forests and both National Parks have either completed, or are in the process of completing fire management plans. These will allow fire to play a greater role in natural succession and stand development. Much of the GYA still has a moderate potential for high intensity fire.

Slightly less than one-half of the GYA is open to cattle and sheep grazing. Grazing continues to affect vegetation, especially in riparian areas where much of the riparian vegetation has changed to drier (xeric) plant communities due to decreased water tables. Disturbance from road, trail, and campground development has also allowed exotic, opportunistic plant species to establish footholds within the area. Many riparian ecosystems no longer function as in the past.

Influences such as freezing, thawing, short growing seasons, frequent and intense windstorms, abrasion by snow, and limited development of soil horizons are the main factors operating within alpine environments. Several frost-related processes such as cracking, wedging, heaving, and sorting contribute to the generation of patterns on the ground such as circles, nets, stripes, and steps. Circles, nets, and stripes normally occur on nearly horizontal ground. Stripes and steps are found on slopes. A sorted pattern has a border of stones. Any of the above patterns may be either sorted or unsorted. Other processes that influence vegetation condition are flooding, landslides, avalanches, glacial action, and forest insects and disease.

Wildlife and Fisheries: Wildlife and fish species composition and population levels have changed over the last 80 to 100 years from pre-settlement conditions. Typically, populations have been reduced, and habitat constricted to the more remote areas as a result of predator control, settlement, and agricultural practices.

Big Game Species: Elk, bighorn sheep, and other species formerly inhabited the prairie and the great plains ecosystems, but these animals now inhabit mainly mountainous regions where human influences have been minimal. Other species in the GYA have a greater distribution than during pre-settlement times. Moose were most likely present in the past, but populations have probably increased since the turn of the century. Mountain goats were not native to the GYA, but were introduced during the 1940's and have steadily increased. Overall, species which depend on early seral stages of forest succession have decreased in population, while species which depend on old growth forest structures have increased from pre-settlement populations.

Threatened and Endangered Species: Grizzly bears, gray wolves, peregrine falcons, and bald eagles which are classified as Threatened or Endangered are species at the top of the food chain.

Grizzly bear populations have been reduced below historic population levels, and their habitat has been reduced by 99 percent in the lower 48 states. The GYA is one of the last remaining strong holds for this species outside of Canada and Alaska. Prior to settlement, grizzly bears primarily inhabited the prairie ecosystems, but now they are restricted to remote mountainous locations and wilderness areas.

Predator controls in the 1800's virtually exterminated the gray wolf within the area. However, recent sightings of animals thought to be wolves have been documented throughout the GYA.

Bald eagles and peregrine falcons were once widespread throughout the area, but predator control measures and land use practices including the use of pesticides (DDT) during the twentieth century vastly reduced the population of both species. Current population trends show an increase towards pre-settlement populations.

Fish: Native fish in the GYA are mountain whitefish, Montana grayling, ling, longnose sucker, mountain sucker, white sucker, longnose dace, mottled sculpin and subspecies of cutthroat trout. Native cutthroat trout include westslope, Yellowstone, including the fine spotted cutthroat of the Snake River basin, and Colorado River subspecies. Lake trout, German brown trout, rainbow trout, golden trout, brook trout, kokanee, and coho are exotic game fish which have been introduced into the GYA.

Sensitive Species: Harlequin duck, townsend bat, big-eared bat, spotted bat, lynx, black-backed woodpeckers, boreal owl, ferruginous hawk, white-tailed prairie dog, and Yellowstone cutthroat trout are all listed as "sensitive" by the Northern Region of the Forest Service and they may be present in the GYA. Because historic wildlife accounts dealt solely with ungulate species, information on past habitat or populations are not readily available for these sensitive species. However, it is safe to assume that habitat conditions required to support these species were more widely spread than now. Due to settlement-related influences, habitats have either been eliminated or modified to a degree that population viability for these species may become questionable. Within the State of Montana, no white-tailed prairie dog populations are found outside of the GYA. Yellowstone cutthroat trout and the harlequin duck have not been documented east of this area.

Species Linkage Within the GYA (Plant and Animal Migration Corridors: The Beartooth Mountain Range lies at the northeastern edge of the GYA. Between this EIS analysis area and the remaining portions of the GYA lies the Absaroka-Beartooth Wilderness which encompasses portions of the Custer and Gallatin National Forests. The Wilderness is not in the decision area, but five drainages begin in the Wilderness and enter the decision area. These drainages are Rock Creek, East and West Rosebud Creeks, West Fork of the Stillwater River, and the Stillwater River. The drainages provide corridors for linkage of individual populations to the remaining portions of the GYA. Seventy-six percent of the GYA is either undeveloped, wilderness, or recommended wilderness or wilderness study area.

The proposed Meeteetse Spires Preserve contains 6,000 acres and includes the Meeteetse Spires Area of Critical Concern (ACC). The preserve is/was created to preserve the habitat of two rare plants, to preserve the diverse assemblage of plant communities, and to prevent degradation of the esthetic quality of the Spires. The ACC contains *Shoshonea pulvinata* which is listed as sensitive by the Northern Region of the Forest Service, and is known in only three locations in Montana and fewer than twelve locations globally. It is a candidate species for Federal listing. *Townsendia spathulata* (listed as sensitive by the Northern Region of the Forest Service) is also present in this specially designated area. Just eight miles to the west of the proposed Meeteetse Spires Preserve is the Absaroka-Beartooth Wilderness, a large reserve containing vast areas of montaine forest, subalpine meadows and forests, and recognized as one of the most significant alpine landscapes in North America. These two reserves contain an unmatched quantity of habitat diversity in the northern portion of the Greater Yellowstone Area. Between these two reserves lies the Line Creek Plateau.

3.1.1 SOILS, AIR, WATER, AND VEGETATION (Issue #1)

3.1.1.1 SOILS RESOURCES

The Forest Plan goal for watershed management is to ensure that soil productivity is maintained (Forest Plan, 1987, pg. 4).

Geologic Setting: The mountains of the Beartooth Range average approximately 8,000 feet in elevation, with plateaus occurring at 9,000 to 11,000 feet, and the highest peaks near 13,000 feet. The range owes its elevation to uplift and faulting during the late Cretaceous and early Tertiary, the period of geologic time 60 to 45 million years ago. Formations present in the area represent all geologic ages except Silurian. The core of the Beartooth Mountains consists of Precambrian igneous and metamorphic rocks (granite and gneiss) which originally were beneath younger sedimentary materials. The uplift of these crystalline rocks caused great distortion and fracturing of the sedimentary rock. Along the margins of the Beartooth Range, illustrated just south of Red Lodge, this granite has been faulted over younger sedimentary rocks such as limestone, sandstone, and shale. The thickness of these overtopped sedimentary rocks in the decision area ranges from zero where not present to nearly 25,000 feet.

Surface rocks which comprise the Beartooth Face are primarily composed of Precambrian-age metamorphic rocks. Most uplifted sedimentary material has eroded off the higher parts of the mountains although some parcels remain as cap rocks. Cretaceous sandstone and shale (Hicks Mountain area) and Tertiary metamorphic and sedimentary rocks (Meyer Mountain and Washburn Mountain area) constitute a small portion of the decision area. Tertiary volcanic rocks predominate at the surface of some areas on the west side of the Beartooth District. Rhyolitic tuffs and flows occur in the headwaters of the Stillwater River. Paleozoic and Mesozoic sedimentary and metamorphic rocks occur in the Bad Canyon/Picket Pin area, in the headwaters of the Stillwater River, and on the east flank of Line Creek Plateau.

A special geologic feature which occurs within the decision area is the limestone palisades found along the Beartooth Face and extending into Wyoming. The palisades were formed by rocks of the Beartooth Range intruding up through the overlying sedimentary rocks, deforming and upending the limestone of the Madison Formation.

Appendix A provides a description of the geologic setting and a generalized stratigraphic column and structure section.

Soils: Soils in the unit can be described in three general categories; those derived from sedimentary, volcanic, or granitic rock. Volcanic soils are known to produce large volumes of sediment in the Gallatin National Forest and Yellowstone National Park. However, in the analysis area, which have a drier climate, volcanic soils have not caused noticeable problems of instability or excessive erosion. Volcanic ash and loess occur in the area, particularly in the surface material of soils in leeward basins.

Most of the area has been glaciated and material of all three lithologic (rock) types have been mixed to form glacial debris. Soils derived from the granitics produce coarser material such as gravelly, cobbly, and bouldery sands and sandy loams. The sedimentary and volcanic rock produces finer-textured soils such as loams, silt loams, and clays. These major textural differences coupled with climatic differences from bottom to top of the mountains create different categories of soil productivity and stability. Some glacial deposits were originally steep and unstable, which caused substantial areas of collapse. However, most of these tills are now relatively stable.

Most soils in the analysis area are young and undeveloped entisols; also present are some slightly older moderately-development inceptisols. Highly developed millisols occur in limited quantity. Millisols contain some surface organic matter. Only some millisols are old enough to have developed strong horizons.

Several soil subgroups are represented including shallow, frozen, ashy, wet, argillic (clay accumulation) and general undifferentiated soils (typic). Most common categories are loamy skeletal and coarse loamy soils. Some finer-textured soils exist, generally at lower elevations where parent material was sedimentary or volcanic rocks.

The analysis area has twenty-five landtypes. Their characteristic soil properties are described in the publication *"Landtypes of the Beartooth Face Planning Unit"*.

Fragile Soils: Soils susceptible to very high or high rates of erosion by water, by wind, mass failure, or loss of sediment offsite into streams are considered fragile and/or high hazard soils. Soils with a low potential for revegetation within a reasonably short period of time following disturbance are also considered fragile and/or high hazard soils.

In the decision area, 94,080 acres consists of fragile soils and/or mass failure hazard soils. See Map 1 in Appendix G for locations. Table 3.3 gives ratings relative to each of the landtypes.

TABLE 3.3
Fragile/High Hazard Landtypes

Landtype	Erosion		Sedimentation		
	Water	Wind	Mass Failure	Offsite Sediment	Revegetation Potential
Alpine Turfs	Low	***High***	Low	Low	***Low***
Steep Rocky Ridges	***High***	Low	Med	***High***	***Low***
Glacial Cirque Headwalls	Med	***High***	Med	Med	***Low***
Lateral Moraines	***V.High***	Low	Low	***V.High***	Med
Collapsed Lateral Moraines	Low	V.Low	***High***	Low	Med
Smooth Mtn. Uplift	***V.High***	Low	Low	***V.High***	Med
Rugged Mtn. Uplift	***V.High***	Low	Med	***V.High***	***Low***
Stream Breaks	***V.High***	Low	Low	***V.High***	Med
Landflows	***High***	V.Low	***High***	***High***	High
Steep Rocky Escarpments	***V.High***	Low	Med	***V.High***	Low
Steep Rolling	***High***	Low	V.Low	***High***	Low

3.1.1.2 AIR AND WATER RESOURCES

Air Resource: The goal of air resource management is to meet or exceed state air quality standards and ensure protection of air quality related values (Forest Plan, 1987, pg. 4).

Due to limited development and excellent wind dispersion, air quality throughout the analysis area is good, with low ambient concentrations of pollutants. Sources of air pollution include wood burning in Red Lodge and Cooke City, vehicle engines, road dust, slash burning, broadcast burning, wildfires, and regional pollution from farther away. Site specific air quality information is limited, but the available data reasonably represents air quality throughout the analysis area. All National Forest lands comply with National Ambient Air Quality Standards.

Air quality is regulated through a series of Federal and state laws and regulations by a number of Federal and state agencies including the Forest Service, EPA, and the Air Quality Bureau of the Montana Department of Health and Environmental Services. The analysis area is classified as a Class II airshed which allows for fairly significant amounts of pollution. Individual agency responsibility, national and Montana Ambient Air Quality Standards, and the Prevention of Significant Deterioration program are described in detail in the project file.

Water Resources: The goal of watershed management is to ensure water quality is maintained at a level which meets or exceeds state water quality standards (Forest Plan, 1987, pg. 4).

Surface Water: The Stillwater River which is a tributary of the Yellowstone River and Rock Creek which is a tributary of the Clark's Fork of the Yellowstone drain most of the analysis area.

The Stillwater River drains the western portions of the area and includes a number of substantial creeks to the east and the west of its mainstem. The West Fork of the Stillwater enters the mainstem just outside the National Forest Boundary and is the collector for all streams west of the Stillwater. Larger tributaries east of the Stillwater mainstem include East and West Rosebud Creeks and Fishtail Creek. The northeastern portion of the area is drained by Rock Creek and it's tributaries into the Clark's Fork of the Yellowstone. Included is the West Fork of Rock Creek, which is the municipal water supply for the town of Red Lodge. The southeast corner of the area is drained by Line Creek directly into the Clark's Fork River in Wyoming. A group of smaller creeks drain the east end of the mountains directly into the Clark's Fork River.

All of these streams are perennial or nearly so since they are replenished by ground water even during the summer. Streamflows vary with peak discharge rates (May through July) more than 100 times larger than low flows (January through March).

Precipitation varies considerably over the Beartooth District. On the average, annual runoff over the entire Beartooth Mountain area is about 20 inches. The volume of surface water flowing from the Custer National Forest portion of the Beartooth Mountains averages about 798,000 acre feet annually, including water originating within the Absaroka-Beartooth Wilderness. This water generally provides adequate volumes for irrigation on lands between the National

Forest and the Yellowstone River and also contributes to irrigation, power generation, and barge traffic farther down the Yellowstone, Missouri, and Mississippi Rivers. Water production from the area is summarized in Table 3.4

TABLE 3.4
Estimated Annual Streamflow Through the Project Area

Drainage	Area in Square Miles	Estimated Annual Flow in Ac Ft	Acre feet per Sq. Mi.
West Fork Stillwater River	128	134,000	1,047
Stillwater River	216	261,000	1,208
Fishtail, East & West Rosebud	225	298,000	1,324
Rock Cr including Red Lodge Cr	115	87,000	757
Total Annual Flow		798,000	

Water rights of individuals to divert springs or small streams for use on nearby private land are currently involved in the state water rights adjudication process. Consumptive use for recreational activities, campgrounds, summer homes, organizational camps, stock water ponds, etc., is estimated to be less than 100 acre-feet per year.

Ground Water: Because of the readily available high-quality surface water, there has been little development of ground water and little information on ground water has been gathered. Water wells in the analysis area are generally in the shallow unconsolidated alluvium along streams, which may be extensive in some valleys. The alluvium provides important local aquifers for domestic and livestock uses, and wells yield up to several hundred gallons per minute where the alluvial material is coarse and permeable. The Precambrian crystalline rocks of the higher Beartooth Mountains generally are not permeable except in faults and cracks, so water wells drilled in this area are not as likely to be successful. The sedimentary and limestone rock below the palisades are more permeable and more likely to provide water sources.

Ground-water quality is excellent except where surface mining from many decades past is still impacting the Upper Stillwater Basin and, to a lesser extent, some small creeks along the lower Stillwater River. Although most streams have steep gradients and coarse bottom material, they are essentially free of turbidity and suspended sediment, except during high water or in areas of natural disturbances such as landslides. This indicates relatively stable channel conditions.

Stream temperatures rarely exceed 55°F even in midsummer and waters are highly saturated with dissolved oxygen. Despite heavy recreational use throughout the summer, limited bacteriological monitoring indicates no contamination from human waste. Surface water is acidic due to limited amounts of calcareous rock such as limestones, dolomites, or calcareous shales to provide buffering.

All streams in the unit are classified by the Montana Department of Health and Environmental Services. These classifications describe the quality at which the water must be maintained under Montana State Law. Presently most of the streams in the analysis area meet the A-1 criteria, although they are classified as B-1. An exception is the West Fork of Rock Creek which has an A-1 classification because it is used as a municipal water supply. An A-1 classification allows fewer coliform bacteria and smaller increases in turbidity and color from land management activities than does a B-1. (Montana Water Quality Act, as amended thru 1984)

3.1.1.3 VEGETATION RESOURCES

Existing vegetation within the decision area is described by vegetative land units and cover types. A brief discussion of existing noxious weed condition is included. Cover type composition and structure is summarized in Table 3.5. Additional information on affected vegetation is included in the Biological Diversity Report and Biological Evaluation which is in the project record.

Table 3.5 summarizes the distribution and abundance of those covers types found within the decision area. The rarity of some early successional stages results from the absence of stand replacing fires and/or past management activities. Some size class names are eliminated if there were no acres in that size class.

Vegetative Land Units and Cover Types

Alpine: This land unit comprises those lands between 8,600-11,000 feet in elevation. All elevations above 11,000 feet are within the Absaroka-Beartooth Wilderness area and are not being considered for possible leasing. Alpine land units support four major vegetation cover types: Geum turf, tufted hairgrass meadow, sedge bog, and willow thicket types. Most alpine meadow communities have recovered from extensive sheep grazing in the late 1800s and early 1900s. Some exotic plant species, such as Kentucky bluegrass and dandelion, have found niches for survival and reproduction.

There are approximately 390 plant species found on the Beartooth Plateau, although much of the high country remains botanically unexplored. About 50 percent of the flora consists of species which also occur in the arctic, and ten of these are annuals. *Koenigia islandica*, a Montana species of concern, is one of these ten. Further detail regarding this species is addressed under the sensitive plant section and in the biological evaluation which is part of the project record.

Plants grow very slowly in the alpine climates of the plateaus and mountain peaks. For this reason it is much more difficult to reclaim disturbed sites at higher elevations. Snow may persist above 8,000 feet until late July or early August, so the growing season is very short and plants barely get started by the time winter returns in early September.

High Timbered Plateau: Whitebark pine cover type dominates this area and is found on dry, exposed slopes and ridges within the 7,800-9,300 foot elevation zone. Lodgepole pine, whitebark pine, subalpine fir, and Engelmann spruce all occur at lower elevations. Shade-tolerant tree species are currently emerging through the whitebark and lodgepole pine canopies. They will dominate most sites until a disturbance, such as fire, restarts ecological succession.

Steep, Rocky, Forested Slopes: Rock outcrops, talus slopes, and cliffs dominate this land type within the 5,500-9,500 foot elevation zone. Many tree species occur on this type due to the large altitudinal gradient and different aspects. Currently lodgepole pine dominates the subalpine fir habitat types.

Subalpine Fir Forest: These areas lie between 7,500-9,000 foot elevation zone. Tree species such as sub-alpine fir, Engelmann spruce, and lodgepole pine are the predominant cover type. Additionally, these areas contain several scattered wet meadows and morainal kettle lakes ("potholes") which afford increased potential for biological diversity. The combination of fire suppression and white pine blister rust has led to severe decreases in the whitebark pine coverage, and shade-tolerant species have proliferated at the expense of whitebark pine.

The current lodgepole pine stands are predominately even-aged, extremely dense, and have little understory vegetation. Dried forest fuels have accumulated due to weather damage, growth suppression, widespread dwarf mistletoe, western gall rust infections, and developing beetle activity. This environment is ripe for stand-replacement fire.

Douglas-fir Forest: Douglas-fir is the primary overstory species found on moister, north slopes between 5,500-8,000 feet, but fire suppression has allowed various conifers to invade this forest type. Lodgepole pine occurs where stand replacement disturbances have occurred, and Engelmann spruce occurs where moist conditions are present around seeps, springs, and higher water tables. Aspen grows on the lower slopes where past fire encouraged root suckering, and excluded conifers from the site. Studies indicate that aspen communities contain a high degree of biological diversity and are extremely important for a large number of game and non-game species. Most aspen communities throughout the entire analysis area are decadent and overmature.

Dry-Timbered Benches and Slopes: Douglas-fir and lodgepole pine are the primary overstory species found between 5,500-8,000 feet. Fire suppression has allowed limber pine to encroach upon grassland/sagebrush communities.

Foothill Grassland: Bluebunch wheatgrass, and Idaho fescue dominate these sites, but big sagebrush has encroached on many grassland communities within this area in indirect response to fire suppression and overgrazing.

Valley Bottoms and Riparian Areas: The goal for riparian areas is to manage for water quality, provide diverse vegetation, and protect key wildlife habitat in these areas from conflicting uses. Riparian areas have perennial water critical for the maintenance of water quality and provide valuable wildlife habitats. Uses and activities that adversely impact these areas will be mitigated (Forest Plan, 1987, pg. 5, 80).

Riparian zones are interspersed throughout the above cover types and consists of approximately

8,650 acres on National Forest lands or five percent of the decision area. Vegetation varies from streamside hardwood forest or coniferous-forested benches to grass meadows and parks. Black cottonwood, aspen, willow, spruce, alder, red osier dogwood, and water birch are found along the streamsides. Cover types such as wet alpine, streamside shrub, and mountain meadow are also included. These are unique, water-dependent communities that are not common in the decision area. Healthy riparian systems filter and purify water as it moves through the riparian-wetland zone. The systems reduce sediment loads and enhance soil stability, provide microclimate moderation when contrasted to temperature extremes in adjacent areas, and contribute to ground-water recharge and base flow. The streams and riparian areas in the analysis area are in excellent condition with a few exceptions and represent a valuable resource.

Wetlands: Wetlands are defined legally by specific characteristics of soil, water table, surface water, and duration of water near or on the ground surface. Some of these parameters can only be documented for a specific land unit by actual measurement over extended periods of time. In the analysis area, most streams are perennial; thus criteria that can be used for determining if a wetland exists is by ascertaining the presence of water-loving plants, and by inspecting the soil for mottling due to fluctuation of a high water table.

Wetlands serve many functions including maintaining water quality, assuring ground-water recharge, temporary storage for streamflow, flood control, wildlife habitat, recreation, and educational uses. Wetlands are protected by both state and Federal regulations.

Floodplains: Floodplain delineation can be more difficult than wetland delineation because vegetative communities do not necessarily correlate with floodplain characteristics. Additionally, the soils on some parts of floodplains may not show any features related to presence of water. There is no floodplain inventory for the decision area.

Minor Vegetation Types: Whitebark pine, subalpine fir, spruce, wet alpine, and cold/windswept (krummholtz) vegetation communities as well as plant communities associated with cliffs, ponds, and lakes occur in the decision area, but are more common at higher elevations in adjacent wilderness area.

Noxious Weeds: Spotted Knapweed (*Centaurea maculosa*), Leafy Spurge (*Euphorbia esula*), and Sulphur Cinquefoil (*Potentilla recta*) are predominant noxious weeds within the decision area. These species infest approximately 200 acres along the lower elevations of the main drainages and foothills within the decision area.

The largest infestations of spotted knapweed occur within the Rock Creek drainage, radiating out from the Red Lodge area. The largest infestations of leafy spurge occur within the East and West Rosebud drainages. Smaller infestations of spotted knapweed and leafy spurge occur sporadically in the decision area and on adjacent lands. Sulphur cinquefoil occurs in both the Red Lodge Creek and Meyers Creek areas. Canada thistle (*Cirsium arvense*) occurs sporadically within the decision area.

The rate of spread of noxious weeds within the decision area appears to be about a five percent increase each year.

TABLE 3.5
Vegetation Cover Types

VEGETATION COVER TYPE	Total Acres	% of Decision Area	% of Cover Type	No. of Units	Average Size (Acres)
LODGEPOLE PINE	**57,890**	32	100		
sawtimber	(21,232)		(37)	135	157
poletimber	(34,895)		(60)	115	303
seedling/sapling	(1,763)		(3)	30	59
DOUGLAS-FIR	**31,433**	18	100		
sawtimber	(23,463)		(75)	141	166
poletimber	(7,963)		(25)	56	142
seedling/sapling	(7)		(0)	1	7

VEGETATION COVER TYPE	Total Acres	% of Decision Area	% of Cover Type	No. of Units	Average Size (Acres)
LPP AND DOUGLAS-FIR	8,523	5	100		
sawtimber	(5,449)		(64)	55	99
poletimber	(3,074)		(36)	30	102
SUBALPINE FIR/SPRUCE	12,080	7	100		
sawtimber	(9,736)		(81)	83	117
poletimber	(2,341)		(19)	16	146
seedling/sapling	(3)		(0)	3	1
PONDEROSA PINE	596	trace	100		
sawtimber	(596)		(100)	2	298
ASPEN	3,677	2	100		
mature	(2,877)		(78)	115	25
immature	(800)		(22)	60	13
COTTONWOOD	549	trace	100		
mature	(485)		(88)	8	61
immature	(64)		(12)	3	21
WHITEBARK PINE	17,953	10	100		
mature	(14,908)		(83)	72	207
immature	(3,045)		(17)	22	138
LIMBER PINE	7,034	4	100		
mature	(3,228)		(46)	24	135
immature	(3,806)		(54)	27	141
KRUMMHOLTZ	219	trace	100	2	110
BUNCHGRASS/SAGEBRUSH	1,171	1	100	10	117
BUNCHGRASS/FORB	19,751	11	100	192	103
MOUNTAIN MEADOW	147	trace	100	10	15
WET ALPINE	262	trace	100	7	37
DRY ALPINE	9,878	6	100	31	319
EXPOSED BEDROCK/TALUS	8,189	5	100	86	95
CLIFFS	96	trace	100	6	16
POND OR LAKE	570	trace	100	32	18
STREAMSIDE SHRUB	794	trace	100	41	19
EXPOSED SOIL	1,582	1	100	9	176
AVALANCHE CHUTE	208	trace	100	6	35
BURN AREA (WILDFIRE)	662	trace	100	2	331

Threatened and Endangered Species, Sensitive Plant Species, and Plant Species of Special Concern: There are no known plant species in the decision area that are listed as Threatened or Endangered by the United States Fish and Wildlife Service. *Shoshonea pulvinata* is endemic to the Beartooth Range, and the sole species of its genus. It is also designated as a Category 2 candidate for Federal listing by the U. S. Fish and Wildlife Service - taxa for which there is some evidence of vulnerability, but for which there is not enough data to support listing at this time.

The Forest Service defined those species for which population viability is a concern as sensitive species. There are six sensitive plant species in the decision area (see Table 3.6 and Map 1 in Appendix G). One additional sensitive plant species is found on the Gallatin National Forest adjacent to the analysis area. This plant could occur within the area, but no populations have been found. There are also 19 species found in alpine habitats which are of special concern to the Montana Natural Heritage Program. This program was established in 1985 to provide a centralized information source on biologically critical areas and species within the State of Montana. The Heritage Program's "species of special concern" include Federal proposed, endangered, threatened, and Forest Service "sensitive" species as well as State endemic species which are rare. Twelve of these are known to be within the alpine habitat of the project analysis area, and the other seven may occur, but no populations have been found.

TABLE 3.6
Forest Service Region One Sensitive Species and State Special Concern Species

Species/Habitat	Common Name	State Rank	Habitat
SENSITIVE SPECIES			
Within the decision area			
Shoshonea pulvinata	Shoshonea	S1	Limestone Outcrops
Gentianopsis simplex	Hiker's Gentian	S1	Wet Valley Bottoms
Kobresia macrocarpa	Large-Fruited Kobresia	S1	Alpine
Salix barrattiana	Barratt's Willow	S1	Alpine
Selaginella watsonii	Watson's Selaginella	S1	Alpine
Thalaspi parviflorum	Small-Flowered Pennycress		
Adjacent to the decision area			
Agoseris lackschewitzii	Pink Agoseris	S1	Alpine
STATE SPECIAL CONCERN SPECIES			
Within the decision area			
Draba porsildii	Porsild's Draba	S1	Alpine
Erigeron flabel-lifolius	Fan-Leaved Daisy	S2	Alpine
Koenigia islandica	Island Koenigia	S1	Alpine
Phippsia algida	Ice Grass	S1	Alpine
Senecio amplectens var. Holmii	Clasping Groundsel	S1	Alpine
Stellaria cras-sifolia	Fleshy Stitchwort	S1	Alpine
Eriophorum callitrix	Sheathed Cottongrass	S1	Alpine
Pedicularis oederi	Oeder's Lousewort	S2	Alpine
Juncus triglumis var. triglumis	3-Flowered Rush	S2	Alpine
Gentianella tenella	Slender Gentian	S2	Alpine
Adjacent to the decision area			
Sagina nivalis	Arctic Pearlwort	S1	Alpine
Papaver kluanensis	Alpine Poppy	S1	Alpine
Saxafraga chrysantha	Golden Saxifrage	S1	Alpine
Senecio fuscatus	Twice Hairy Butterweed	S2	Alpine
Pedicularis oederi	Oeder's Lousewort	S2	Alpine
Gentiana prostrata	Pygmy Gentian	S2	Alpine
Saxafraga apetala	Tiny Swamp Saxifrage	S2	Alpine

Note: More specific information on each individual species can be found in the project file record.

Pre- and Post-Settlement Comparison

This section compares and contrasts the condition of the biotic community before and after European settlement. Table 3.7 compares the percent of the analysis area which contained various species of trees before settlement against the percent of the area covered with the same tree species today.

TABLE 3.7
Forest Conditions

Classification	Pre-1900 Composition (%)	Existing Composition (%)
Tree Species		
Limber Pine	6	5
Lodgepole Pine	49	41
Lodgepole Pine and Douglas-Fir		6
Ponderosa Pine	1	<1
Whitebark Pine	11	13
Douglas-fir	7	23
Subalpine Fir and Engelmann Spruce	22	9
Aspen and Cottonwood	4	4
Tree Age Class		
<50 years	10	<1
50-120 years	50	40
120-300 years	40	59
Landscape Composition		
Forested Land	42	76
Non-Forested Land	58	24
Burned Land	24 percent (1882-1904)	

Currently, there is more Douglas-fir overstory and less lodgepole pine overstory. This is indicative of successional change to more shade-tolerant species. Similarly, there is slightly more whitebark pine overstory compared to less subalpine-fir/Engelmann spruce cover. This is not the usual ratio, and may reflect the inclusion of data on presettlement conditions which includes acreage outside of the decision area.

The shift in age-class distribution since pre-settlement is the most dramatic statistical change. Most vegetative overstory is over 50 years old. Since pre-settlement time, there is ten percent less acreage in the immature to mature forest cover, and a 19-percent increase in mature to old growth forest communities. It appears the overall forest communities are older, patch size is larger, and patches are less frequent across the landscape when compared to pre-settlement conditions.

3.1.2 FISH AND WILDLIFE (Issue #2)

The Forest Plan goal for wildlife and fisheries management is to manage and/or improve key wildlife and fisheries habitats, to enhance habitat quality and diversity, and to provide wildlife and fish-oriented recreation opportunities.

Table 3.8 displays statistics for the analysis and decision areas. The analysis area includes the portion of the Absaroka-Beartooth Wilderness within the Beartooth Ranger District, lands within the Forest boundary, and adjacent BLM and private lands in the Line Creek Elk Range. The decision area includes only the National Forest system lands outside of the wilderness area. Citations are in the project record wildlife report. Species are included which have not been documented in the analysis and/or decision area but for which potential habitat occurs in the area. Specifically, these include bats, grey wolf, black-backed woodpecker, boreal owl, and lynx.

TABLE 3.8
Decision and Analysis Area Statistics

Species or Habitat	Analysis Area	Decision Area		Wilderness, Private, or BLM
Sensitive Species				
Yellowstone Cutthroat Trout Habitat (miles)				
Genetically Verified	4	3	1	private
Presumed Genetically Pure	54	22	32	private or wilderness
Totals	**58**	**25**	**33**	
Bats (acres potential habitat)	Undetermined		2,980	Undetermined
Harlequin Duck Habitat (miles)				
Stillwater River	25	5	20	
West Rosebud Creek	12	4	8	
East Rosebud Creek	16	6	10	
West Fork of Rock Creek	23	16	7	
Lake Fork of Rock Creek	11	2	9	
Main Fork of Rock Creek	13	0	13	
Totals	**100**	**33**	**67**	
Threatened and Endangered Species				
Gray Wolf (acres potential hab)	Undetermined		90,920	Undetermined
Grizzly Bear Habitat (acres)				
Management Situation 1		2,740		Undetermined
Management Situation 2	112,270	4,360**	107,830	Wilderness
Totals:		**7,850**		
Bald Eagle Nests (nest sites)	0	0	0	
Bald Eagle Habitat (acres)	5,380	4,280		
Peregrine Falcon (Hack Sites)	1	0	1	Wilderness
Peregrine Falcon Habitat (acres)	42,670	31,280		
Golden Eagle Nests (Nest Sites)	4	3	1	
Golden Eagle Habitat (acres)	55,630	45,180		
Prairie Falcon Nests (Nest Sites)	1	1	1	Private Land
Prairie Falcon Habitat (acres)	55,630	45,550		
Elk Home Ranges (acres)				
Line Creek Summer/Fall	13,560	12,750	860	Private or BLM
Line Creek Winter/Spring	10,440	7,960	2,440	Private or BLM
Hellroaring Summer/Fall	3,190	220	3,410	Wilderness
Hellroaring/Silver Run Winter/Spring	2,440	2,240	300	Private
Silver Run Summer/Fall	11,350	180	11,170	Wilderness
Luther Summer/Fall ***	9,990	200	9,790	Wilderness
Luther Winter/Spring ***	8,150	0	8,150	Private
Black Butte Summer/Fall ***	20,770	12,420		
Black Butte Winter/Spring ***	13,670	180	13,370	Private
Picket Pin & Meyers Cr Summer/Fall	15,160	240	14,930	Wilderness
Picket Pin Winter/Spring	2,880	850	1,980	Private
Meyers Creek Winter/Spring	2,660	1,780	260	Private
Trout Creek Summer/Fall	3,230	140	3,050	Private
Trout Creek Winter/Spring	3,830	140	3,700	Private
Totals	**138,920**	**39,300**	**88,090**	

Species or Habitat	Analysis Area	Decision Area		Wilderness, Private, or BLM
Moose Home Range (acres)				
East Rosebud Winter/Spring	3,290	810	21,320	Private
Lodge Pole Cr Winter/Spring 730	730	0	Private	
McDonald Basin Winter/Spring	17,810	9,790	6,760	Wilderness or Private
McDonald Basin Summer/Fall		1,170		
Palisades Winter/Spring	3,970	520	3,300	Private
Red Lodge Creek Winter/Spring	4,830	620	4,030	Private
Stillwater River Winter/Spring	7,240	0	7,240	Wilderness
West Fork Stillwater River Winter/Spring	1,690	1,160	480	Wilderness
Totals	**39,560**	**14,800**	**43,130**	
Mountain Goat Home Range (acres)				
East Rosebud Winter/Spring	3,990	30	3,960	Wilderness
Hellroaring Winter/Spring	11,110	0	11,110	Wilderness
Line Creek Summer and Winter Range	4,510	4,140	470	Wilderness
West Rosebud Winter/Spring	4,820	0	4,820	Wilderness
Totals	**24,430**	**4,170**	**20,360**	
Big Horn Sheep Home Range (acres)				
Rock Creek Winter/Spring	12,090	5,250	7,010	Wilderness
Stillwater Winter/Spring	5,620	2,550	2,400	Wilderness or Private
West Rosebud Winter/Spring	14,730	3,410		
Totals	**47,410**	**11,210**	**9,410**	
Mule Deer Home Ranges (acres)				
Sheep Cr. Winter/Spring	8,540	1,870	6,670	Private
Totals	**100,800**	**1,870**	**93,010**	
Lynx (acres potential habitat)				
Denning	Undetermined		8,760	Undetermined
Foraging	Undetermined		47,130	Undetermined
Black-backed Woodpecker (acres potential habitat)	Undetermined		30,970	Undetermined
Boreal Owl Habitat (acres potential habitat)	Undetermined		59,880	Undetermined
Marten	Undetermined		66,960	Undetermined
Wolverine (Summer/Winter) (acres potential habitat)	Undetermined		43,920/4,650	Undetermined

** Of the 4,360 acres of MS 2 habitat within the decision area, 2,890 acres are within Cooke City Management Area C, and the remaining are outside the classified wilderness in the vicinity of Crescent Creek in Management Area E.

*** Based on 15 years of visual observation by Montana Department of Fish, Wildlife and Parks. All other elk data is based on 1988 to 1991 radio telemetry.

3.1.2.1 FISH

Geographical Setting and Historical Perspective: All streams originating and/or flowing through the analysis area are within the Yellowstone River system. Major drainages include the Stillwater River, East and West Rosebud Creeks, Main Rock Creek, West Fork of Rock Creek and the Clarks Fork of the Yellowstone River. These streams provide a substantial amount of fish habitat and recreational fishing and are regionally significant within south-central Montana.

Little historical information associated with aquatic environments and resources, specific to the Beartooth Oil and Gas EIS analysis area, is available.

There were, however, early expeditions into the Montana territory which provide a likely approximation of historic aquatic resources within the analysis area. Based on the observations and collections of early workers in areas similar to the analysis area, the following fish species may be expected to have been present: cutthroat trout (Yellowstone subspecies), mountain whitefish, longnose sucker, mountain sucker, white sucker, longnose dace, and mottled sculpin. Flowing water environments were the predominant habitats in which these fishes would have been found. It is expected that most, if not all, of the lake environments would have been void of fish.

Definitive aquatic flora and fauna species lists for the environments within the analysis area are not available. A major factor influencing the historic biodiversity within Montana and specifically within the analysis area has been the introduction of exotic fish species, including rainbow trout, brown trout, brook trout, and arctic grayling. These species have influenced the native fishes. The first influence is hybridization and loss of genetic integrity of Yellowstone cutthroat trout, specifically with rainbow trout. The second influence is competition and predation between the introduced and native fish species. Brown trout and brook trout are both highly competitive for space and food. The extent to which fish introductions have influenced micro- and macro-invertebrate and plant communities within the analysis area is unknown. It may be that these trout introductions have had little effect on macro-invertebrate species composition but there may have been an effect on species behavior.

Land uses have also influenced the aquatic flora and fauna of the analysis area. Numerous habitats have been affected by forestry, mining, grazing, agricultural, and recreational activities. These activities have not only drastically reduced the amount of suitable habitat, they have also favored the displacement of native cutthroat by the more tolerant introduced trout species. These habitat changes have also enhanced the competitive position of certain native species (e.g. suckers and certain minnow species). Changes in the macro-invertebrate communities, in all probability, have also occurred to some extent. The diversity of fish species present within the analysis area has increased with the addition of non-native trout species. This species increase is coupled with a drastic decline in the occurrence of native Yellowstone cutthroat trout and possibly other native aquatic flora and fauna. The exact amount and nature of ecological changes within the analysis area that might have resulted from these introductions are poorly understood at the present time.

Management Direction: Management direction associated with the fish resource within the analysis area is contained in the Forest Plan (p. 3, 4, 18, 19). Management objectives emphasize active management of habitat, mitigation of adverse effects from other resource activities and special consideration for high interest species (e.g. Yellowstone cutthroat trout, a "sensitive species" and a management indicator species). This special consideration includes the designation of key habitat where other resource activities are modified. The Montana Department of Fish, Wildlife and Parks recognizes the sensitive nature of Yellowstone cutthroat trout and has classified this subspecies as a special management concern. A conservation strategy (species management guide) is being developed for Yellowstone cutthroat trout.

A four-mile stretch of Bad Canyon Creek within the analysis area contains genetically verified Yellowstone Cutthroat Trout. The Yellowstone cutthroat trout in Bad Canyon Creek extend downstream beyond the Forest boundary. Within the decision area an additional 23 miles of stream are presumed to have genetically pure strains within the decision area. See Map 3 in Appendix G.

Affected Environment: Most of the available information was collected as part of various fishery investigations and is on file as a part of the analysis record. Several drainage-specific inventories and management plans have been developed for streams and lakes within the analysis area. Current habitat conditions in the streams vary from excellent to poor depending upon site specific circumstances.

More than 85 named stream courses and over 15 named lakes occur within the analysis area. Numerous unnamed perennial streams and lakes are present that either provide habitat or contribute water of high quality to downstream environments. All of these streams and lakes have established communities of aquatic insects and other invertebrates, and many support endemic or introduced populations of fish. A number of amphibian, reptile, bird, and mammal species are also either directly or indirectly associated with the aquatic environments.

The lakes within the analysis area are typically referred to as mountain lakes, which tend to be smaller in size and less productive in terms of biotic community than lakes at lower elevations. Most lakes within the decision area are natural lake basins, but some have man-made containment structures that increase the volume of stored water. Water chemistries show generally low conductivities, alkalinities and nutrient levels. Fish species found in the lakes include many of the same species found in the streams.

The entire area under analysis is within the historic range of Yellowstone cutthroat trout. An effort to identify existing, genetically pure, populations within and outside of the historic range is currently underway. Currently only Bad Canyon Creek has been determined to contain genetically pure Yellowstone cutthroat trout. Approximately four (4) miles of stream habitat in Bad Canyon Creek occurs on the Forest with an addition three (3) miles occurring downstream on BLM-administered lands. Several other streams that occur within or in close proximity to the analysis area contain cutthroat trout populations that are suspected to be genetically pure. These environments include Chicken Creek, East and West Forks of West Red Lodge Creek, Little Rocky Creek, Rock Creek, the Stillwater River and Woodbine Creek. These streams provide approximately 54 miles of suitable habitat on the Forest.

For additional information on fisheries classifications used in this analysis see the project record.

3.1.2.2 THREATENED AND ENDANGERED ANIMAL SPECIES

The Goal for the Management of Threatened and Endangered Animal Species is to provide habitat that contributes to the recovery of the species (Forest Plan, 1987, pg. 3).

Grizzly Bear

Grizzly bears are currently listed as a Threatened Species by the US Fish and Wildlife Service. A portion of the Beartooth Ranger District lies within Boulder Bear Management Unit of the Yellowstone Grizzly Bear Ecosystem (YGBE). The minimum calculated population within the YGBE is 228 animals.

Occupied grizzly bear habitat exists within the Cooke City portion of the EIS decision area. This portion of the Custer National Forest is classified as either Management Situation (MS) 1 or 2 (Interagency Grizzly Bear Coordination Guidelines 1986). Within this management area, there exists approximately 2,740 acres of MS 1 designated habitat and approximately 2,890 acres of MS 2 grizzly bear habitat. In addition, approximately 1,470 acres of MS 2 habitat is located within the decision area within Management Area "E" adjacent to the Absaroka-Beartooth Wilderness.

MS 1 areas are defined as those that contain grizzly bear population centers and habitat components needed for the survival and recovery of the species or a segment of its population. The probability is very great that major Federal activities or programs may affect the grizzly bear in this portion of the EIS study area. MS 2 areas are those that lack distinct grizzly population centers. Highly suitable habitat is generally lacking, but may contain some grizzly bear habitat components. Grizzly bears may be present occasionally. MS 2 areas are considered either unnecessary for species survival and recovery, or the need for the area hasn't been determined. Federal activities in these areas may effect the conservation of the grizzly bear by contributing to human-caused bear mortality or affecting habitat use in adjacent MS 1 habitats.

Table 3.8 displays MS 1 and MS 2 acres within both the decision and analysis area for this project.

The remainder of the Beartooth District is classified as Management Situation 5 habitats. These are areas where grizzly bears do not occur or are only rarely seen. They may contain suitable habitats, but these are unoccupied. Survival and recovery values for grizzly bears are lacking or unknown. Federal activities in these areas probably will not effect grizzly bear conservation and recovery.

Bald Eagle

Bald eagles are occasionally observed in the decision area, primarily during the late fall, winter and early spring. Portions of the decision area are considered suitable as winter roost and foraging habitat for bald eagles.

Night roost habitat for wintering bald eagles consists of large diameter conifer stands that are protected from prevailing winds. Generally, these are located on the lee sides of hills or in protected basins. Ponderosa pine is a preferred species due to the open canopies and large branch diameters that mature trees exhibit. These stands are generally adjacent to river systems, wetlands or open areas that provide eagles with foraging opportunities. No night roost areas have been identified on the Stillwater River.

Previous investigators describe foraging and roost habitat on the Stillwater River and suggests that winter use is probably sporadic and influenced by the presence of open water or carrion availability. Day roost habitat on the Stillwater River exists within the cottonwood riparian stands along the West Fork and Main Stillwater Rivers. An area of concentrated perching or roosting use exists in the extensive cottonwood woodlands along the Stillwater River on the Keogh Ranch. Night roosting most likely takes place outside of the riparian woodlands in open, but sheltered, old growth pine stands within flying distance of foraging habitat along the river. Wintering bald eagles are also sporadically seen in cottonwoods on Rock Creek, East Rosebud Creek, and West Rosebud Creek, generally outside the Forest boundary.

Day roost habitat on the Stillwater River exists within the cottonwood riparian stands along the West Fork and Main Stillwater Rivers. An area of concentrated perching or roosting use exists in the extensive cottonwood woodlands along the Stillwater River on the Keogh Ranch. Up to seven bald eagles have been observed utilizing this area as a day roost at one time. Night roosting most likely takes place outside of the riparian woodlands in open, but sheltered, old growth pine stands within flying distance of foraging habitat along the river. Wintering bald eagles are also sporadically seen in cottonwoods on Rock Creek, generally off of the Forest boundary. Approximately 4,350 acres of bald eagle winter habitat has been identified in the decision area. There are no known bald eagle nest sites within the decision area, although local residents have reported bald eagles during the summer months.

Bald eagle nesting habitat is generally associated with large diameter conifer or cottonwood stands within one mile of a large river or lake (> 80 acres). Nest sites are generally greater than 1/4 mile from roads and are not subject to frequent human disturbance. Within the Greater Yellowstone ecosystem, bald eagle nests have been documented on all major rivers and lakes. The closest highly suitable nesting habitat is located along the Yellowstone River extending from Yellowstone National Park north into Paradise Valley. Nest sites are also known along the Yellowstone River, north of the project area.

Immediately adjacent to the decision area, portions of the Stillwater River possess attributes that render the area suitable as bald eagle nesting habitat. However, this portion of the Stillwater River is paralleled by County Road 419, which receives considerable traffic volume. Other Yellowstone River tributaries in the project area, including Rock Creek, and East and West Rosebud Creek, are considered marginal as foraging habitat for bald eagles. Lakes within the decision area are generally high elevation, and are considered marginal for nesting bald eagles.

Gray Wolf

Although the Greater Yellowstone Ecosystem does not currently support a viable population of wolves, several sightings suggest the presence of this species in and adjacent to Yellowstone National Park. Previous reports state that 81 probable reports involving 109 animals were classified as large canids (possible wolf) between 1968 and 1977.

Currently, the U.S. Fish and Wildlife Service is preparing an Environmental Impact Statement assessing the potential for reintroducing gray wolves into Yellowstone National Park. There is the potential for wolves to use the project area as the gray wolf population expands either through natural expansion, or as a result of reintroduction efforts in Yellowstone National Park.

Potential wolf habitat is typically associated with three important components: 1) a year round basis of ungulates and an alternate prey base; 2) suitable and secluded denning and rendezvous sites; and 3) sufficient space with minimal exposure to humans. Wolves are tied closely to habitats of large ungulate species, such as elk, moose and deer. Although wolves will readily use roads as travel corridors, improved access can also lead to human/wolf encounters and put wolves at risk for take. For example, in North Dakota and Idaho, wolf-like specimens were taken by hunters that mistook them for coyotes. Other researchers have stated that accidental taking of wolves by hunting or trapping is a significant concern.

Areas surrounding four elk herds and one moose herd which inhabit the decision area were identified as potentially meeting the previously mentioned habitat criteria. Areas that may serve as suitable wolf habitat exist in proximity of the Line Creek elk core winter and summer ranges, Hellroaring/Silver Run elk core winter and summer ranges, and Picket Pin elk core winter and summer ranges, and McDonald Basin core winter ranges for moose. For the most part, these core habitats are also in unroaded areas. Refer to the sections on moose and elk for information relative only to these species.

Peregrine Falcon

In the Greater Yellowstone Area, nesting habitat for peregrine falcons is associated with cliffs that exhibit a considerable amount of sheer cliff face below 9500 feet in elevation. Preferred nest sites are in close proximity to suitable foraging habitat. Foraging habitat is associated with wetland, meadow, open water and riverine systems with high densities of passerines, shorebirds and waterfowl.

In 1991, 29 nesting pairs were documented located within the tri-state area of Montana, Wyoming and

Idaho. Thirty-two pairs historically occupied this area. Peregrine falcon recovery targets for the tri-state area are 30 nesting pairs. Population expansion should continue as long as suitable habitat and a clean environment exist. As the population increases, birds will move to nearby empty habitats and occupy vacant breeding territories.

In the Greater Yellowstone Area peregrine falcons have generally been released into the wild by hacking (reintroducing captive reared peregrine falcons into an artificial nest site and cared for by humans until the birds reach independence). On the Beartooth Ranger District, one hack site was established within the East Rosebud drainage in 1990. This hack site is located approximately 0.7 miles within the Absaroka-Beartooth Wilderness boundary. Three birds were introduced into the wild using this method.

Currently, there are no known active eyeries on the Beartooth Ranger District, although adult peregrine falcons have been observed within the analysis area. The Stillwater River drainage is considered excellent habitat because of the size of the drainage, suitability of foraging habitats and low elevation attributes. Previous investigation suggests that 80 percent of the habitats located in the Stillwater River Drainage are suitable for foraging habitat. Although formal habitat classification surveys have not been done outside of the Stillwater River drainage, an estimated 42,670 acres of suitable peregrine falcon nesting and associated foraging habitat exists within the analysis area. Of this acreage, approximately 31,500 acres of suitable peregrine falcon habitat exist within the decision area.

3.1.2.3 SENSITIVE WILDLIFE SPECIES

Townsend's Big-eared Bat, Spotted Bat, and Pallid Bat

Potential habitat for these three species of sensitive bats does occur within the project area. The most suitable habitat exists on the eastern portion of Line Creek Plateau, and in the vicinity of Red Lodge Mountain. In these areas, a series of limestone palisades runs in a northwest to southeast direction across some of the lower elevation portions of the project area. Caves are suspected in this formation, but remain largely unsurveyed. Additional limestone palisades habitat occurs outside of the Forest boundary. Lower elevation habitats in close proximity to these areas could function as foraging habitat for all three species.

Limestone palisades in the project area are not considered as suitable for cave formation, and hence bat hibernacula and maternity roost sites, as those occurring in the the Pryor Mountains, where all three bat species have been documented. Limestone formations in the Pryor Mountains are not palisade type formations, and are more susceptible to the erosive processes that result in caves considered suitable as hibernacula or maternity roost sites.

Connectivity between these habitats and other habitats in eastern Montana are largely unknown. Habitat suitable for maternity roost sites and hibernacula tend to be scattered and isolated over eastern Montana, northern Wyoming and the western Dakotas. Outside of the Pryor Mountains, pallid bats and spotted bats have not been documented in Montana. Townsend's big-eared bats have been documented on and adjacent to several other Forests in the Region.

Potential habitats within the decision area includes areas that are ¼ mile or less from palisade type habitats. Within the project area, there are approximately 9,370 acres of limestone palisade formation that could contain caves that function as hibernacula or maternity roost sites for these species.

Harlequin Duck

Within the western region, harlequin ducks breed from the Aleutian Islands in Alaska, east to British Columbia and Alberta, and south to central California and northwestern Wyoming. They are an uncommon, local breeding species throughout the Rocky Mountains. These isolated breeding populations migrate in the fall to winter along the North American Pacific Coast.

Breeding and brood rearing habitat in the Northern Rockies has been described as low gradient (i.e. less than 2 percent) pristine mountain streams (greater than 10 meters wide) and having an abundance of shrubby riparian vegetation in a forested setting. Hens with broods are dependent on waters having little or no velocity.

Suitable habitat for harlequin ducks occurs on second order or larger streams over much of the Beartooth Ranger District. The Beartooth Ranger District is probably the eastern extent of the species range in Montana. Several observation records exist for harlequin ducks on or adjacent to the Beartooth District. No broods have been documented to date. Breeding pairs and broods have been documented in Yellowstone National Park adjacent to the project area.

Generally, harlequin duck require habitats comprised of mountainous streams with high water quality, and segments of low gradient. Harlequins breed along remote streams away from concentrated human activities. The physical features of nesting habitat include very low gradient streams sections with dense shrubs lining the banks, braided channels, swift currents and water rich in aquatic fauna. Harlequins will use turbulent streams sections for security and feeding activities. Aquatic invertebrates contained within these streams serve as the primary food source for this species.

Historically, lower reaches of the Stillwater River, Rock Creek and Rosebud Creek drainages may have provided excellent nesting brood rearing habitat. Heavy human use on these drainages (recreationists) may be a major limiting factor to current use of these habitats. The better habitat for harlequin duck nesting and brood rearing habitat probably lies within the Absaroka/Beartooth Wilderness Area.

Of the 33 miles of potential harlequin duck habitat within the decision area, approximately 31 miles are paralleled by Forest development roads accessing recreational facilities. This level of road construction and use has rendered the vast majority of harlequin duck habitat unusable for brood rearing purposes.

Lynx

Although lynx have not been identified within the administrative boundary of the Beartooth Ranger District, tracks were documented on the Shoshone National Forest 20-25 miles south of the decision area. These observations were made in lodgepole/spruce vegetation communities.

Lynx are generally associated with large tracts of boreal forest that contain open areas such as bogs and rock outcrops. In Montana, the more suitable habitats are most abundant in the northwestern and north-central portions of the state.

Although lynx populations are often corroborated with snowshoe (*Lepus americanus*) populations, they will also use alternative prey including carrion, small mammals, grouse, and other bird species. Denning sites are generally associated with mature, dense lodgepole pine, subalpine fir and spruce. Foraging sites include early seral forests and small openings. Within the project area, approximately 10,010 acres are located within sawtimber size subalpine fir/ spruce, and could be considered suitable for denning. An additional 48,530 acres could function as foraging habitat. The Beartooth Ranger District may be the eastern extent of this species in Montana.

Denning habitat is located at higher elevations adjacent to the Absaroka/ Beartooth Wilderness Area. Foraging habitat is distributed throughout the project area. The wilderness could function as a refugia for lynx in providing a large area of undisturbed habitat. Riparian communities along the Stillwater River, Rock Creek, and Rosebud Creek drainages provide corridors connecting the lower elevation foraging habitat with the higher elevation denning habitat. Habitats also extend west onto the Gallatin and south onto the Shoshone National Forests and into Yellowstone National Park.

Human encroachment into lynx habitat is considered a significant limiting factor on populations as it increases susceptability to trapping. Road densities of less than 1 mi/sq.mi. of habitat is recommended. Within habitats considered suitable as denning and foraging habitat for lynx, road densities have not been determined.

Black-backed Woodpecker

Black-backed woodpecker are associated with concentrations of dead or decaying trees and logs. Often, these sites are found in proximity to recently burned forests. Engelmann spruce, lodgepole pine, Douglas-fir, ponderosa pine, and western larch provide suitable nesting substrates. Periodic stand replacing fires may be important in providing habitat for this species. Investigations have found that black-backed woodpeckers foraged on snags in open burned areas but nested in adjacent unburned spruce/subalpine fir stands.

Black-backed woodpeckers likely exist in the project area. Habitats considered suitable for this species includes sawtimber size or larger stands of lodgepole pine, subalpine fir/spruce, and Douglas-fir cover types. Within the project area, approximately 59,900 acres. Conifer stands in smaller size classes (< 9") may be suitable for foraging, but not for nesting habitat.

Habitats suitable for black-backed woodpeckers extend into the Beartooth/ Absaroka Wilderness Area, Yellowstone National Park, the Gallatin National Forest and the Shoshone National Forests. Black-backed woodpeckers are widely distributed but locally uncommon over much of the western United States. The project area is an eastern extension of suitable habitat for this species.

The most significant concerns relative to black-backed woodpecker populations are the loss of suitable nesting and foraging habitat as a result of logging, and fire suppression.

Boreal Owl

Habitats considered suitable for boreal owls include sawtimber sized lodgepole pine, Douglas-fir, subalpine fir/spruce vegetative cover types. Nesting habitats include mixed conifer, aspen, Douglas-fir and spruce-fir forests. Nest sites were in older seral stands with open understories and a multi-layered canopy. In central Montana, boreal owls may be associated with higher elevation lodgepole pine stands intermixed with meadows. Although no records exist for the species on the Custer National Forest, inventories for boreal owls in the Little Belt Mountains documented 6 individuals. Five of these were in lodgepole pine stands, and the remaining one was in a whitebark pine. Doumented boreal owls in the vicinity of Cooke City in lodgepole pine stands have been reported. The species undoubtedly occurs on the Forest at higher elevations.

Within the project area, 59,880 acres are included in these cover types and could provide suitable boreal owl nesting habitat. Habitats for this species are well distributed at higher elevations within the project area. Suitable habitat generally occurs as stands averaging 135 acres, surrounded by other vegetation cover types, or smaller size class conifer habitats. These are considered suitable for foraging, but not nesting habitat. Open cover types such as bunchgrass, talus, and alpine habitats are not considered suitable for boreal owls.

Habitat linkages occur between the project area and the Absaroka/Beartooth Wilderness, and undoubtedly extend onto the Gallatin and Shoshone National Forests, and Yellowstone National Park. The Beartooth Ranger District is likely the eastern extension of suitable habitat for the boreal owl in Montana.

As with black-backed woodpecker, the greatest concern for boreal owl populations is reduction and isolation of suitable nesting and foraging habitat as a result of logging.

Ferruginous Hawk

Ferruginous hawks inhabit open prairie grasslands and plains of the western United States. Generally, nest sites are on the ground on low hillsides, ridge tops or buttes; but are occasionally in junipers, willows, cottonwoods, or other substrates. Nest sites are associated with hills and ridges between broad, flat valleys which provide hunting areas and develop thermal currents are preferred. Breeding pairs are sensitive to human activity near nest sites. Abandonment can occur if the nests are disturbed before eggs hatch.

No ferruginous hawk nest sites are known in the analysis area. The decision area contains no suitable nesting habitat and this species is known only peripheral to the analysis area.

White-Tailed Prairie Dog

In Montana, the white-tailed prairie dog is known to occur only within Carbon County. Occurrence of this species within Montana seems to have always been limited. Surveys conducted prior to 1920, indicated population distribution only within the Clark's Fork of the Yellowstone drainage.

The species range corresponds roughly to the arid 6-9 inch precipitation zone. Here, landform varies from nearly level to moderately steep, with elevatios ranging from 3,800-5,800 feet. Vegetation surrounding prairie dog towns varies greatly from site to site.

Within the analysis area there exist approximately 770 to 630 acres of occupied habitat. Within the decision area, there exist approximately 50 acres. The largest known colony of white-tailed prairie dogs encompasses approximately 250 acres and includes the 50 acres within the decision area.

The largest known cause of mortality to this species is natural predation by golden eagles, red fox, coyotes, and badger. The behavior of white-tailed pups during June and July makes them very susceptible to eagle predation.

3.1.2.4 IMPORTANT HABITATS FOR ELK

Summer Range: Wet and dry alpine environments; Elk make disproportionately heavy use of alpine areas, particularly wet alpine areas, during summer. Such sites, typically above 3000 m, confer the following advantages: 1.) Abundant moisture, 2.) Plant growth concentrated in short growing seasons, producing rapid plant growth and high plant nutrient levels, 3.) Plant growth concentrated in a single (ground) forage layer leading to highly efficient foraging, 4.) Low heat and insect stress due to cooler temperatures and high winds, and 5.) Minimal human disturbance because of occurrence in roadless areas. Wet alpine environments in this District in non-wilderness areas are most concentrated on the Line Creek Plateau and in the Iron Mountain-Picket Pin Lakes area.

Winter Range: Bunchgrass-forb and bunchgrass-sagebrush environments and burned over areas typically receive disproportionally high use during the winter/spring seasonal of the year. Elk forage preferentially in bunchgrass-forb and bunchgrass-sagebrush environments during winter and spring. The former receive especially heavy use if recently burned. Where such habitats coincide with winter elk ranges.

Within the administrative boundaries of the Beartooth District there exist 8 separate elk herds. Approximately 850 to 1000 head of elk inhabit the decision area on at least a seasonal basis. However, the annual harvest averages about 100 to 125 animals each year across the Beartooth Face.

Additional detailed information is contained in published reports concerning seasonal home range utilization and individual herd population data. These reports are contained in the administrative project file, and are hereby incorporated by reference.

Picket Pin Herd

The Picket Pin population is comprised of approximately 80-90 animals. Map 4 in Appendix G, shows areas defined as "core" summer/fall and winter/spring ranges for this herd. Additionally, Table 3.8 displays the acres of seasonal home ranges for this herd within the analysis and decision areas for this project. Generally, Picket Pin elk concentrate activity in areas of low to moderate slopes west of the confluence of Castle Creek and the West Fork of the Stillwater River west to steep slopes of Douglas-fir stands west of the Picket Pin road. Primary cover types used are Douglas-fir (fall) and bunchgrass-forb and limber pine stands (winter and spring).

Meyers Creek Herd

The Meyers Creek herd is comprised of approximately 80-90 animals. Meyers Creek elk concentrate activity in the area bounded by Dead Indian Creek (north), Lodgepole Creek (east), Meyers Creek (south) and Washburn Mountain (west). The Meyers Creek herd typically spends the summer and fall months in in a shared core summer/fall range with the Picket Pin herd. Map 4 in Appendix G indicates "core" seasonal home ranges for both summer/fall and winter/spring elk use. Additionally, Table 3.8 displays the acres of seasonal home ranges for this herd within the analysis and decision areas for this project.

Trout Creek Herd

The Trout Creek herd is comprised of a pioneering segment of the Meyers Creek herd. The Majority of "core" summer/fall and winter/spring ranges lie on private lands immediately adjacent to the Forest boundary. Map 4 in Appendix G indicates the core home ranges used on a seasonal basis for this herd. Table 3.8 displays the acres of seasonal home ranges for this herd within the analysis and decision areas for this project.

Black Butte and Luther Herds

Elk within these two herds utilize home ranges with vegetative characteristics different than other elk herds within the analysis area. Summer/fall ranges typically lie within or adjacent to the Absaroka-Beartooth Wilderness. Dense stands of Lodgepole pine adjacent to alpine environments are sought during this time of the year. The majority of winter range use occurs on private land adjacent to the decision area. Map 4 in Appendix G indicates seasonal home ranges for this herd. Table 3.8 displays acres of seasonal home ranges for these two herds both within the analysis and decision areas for this project.

Silver Run and Hellroaring Herds

The majority of the summer/fall home ranges for these two herds occurs within the Absaroka-Beartooth Wilderness. Typically, wet alpine environments are sought for the nutritional quality of the forage produced in these areas. The two herds share a common winter range, newly designated as the "Point of Rock Wildlife Management Area", by the State of Montana to provide required winter home ranges for these herds. A large portion of this shared winter range does occur within the administrative boundaries of the Beartooth Ranger District.

The Silver Run Herd at one time made extensive use of the area in the vicinity of Silver Run Creek. This is no longer the case. This area has been impacted by subdivision and housing development in the immediate area. This has led to a lower use of the area in recent years.

Map 4 in Appendix G indicates locations of seasonal "core" home ranges used by these two herds. Additionally, Table 3.8 Elk displays acres of seasonal home ranges within the analysis and decision areas.

Line Creek Herd

A population of approximately 150 elk, known as the Line Creek herd, make extensive use of the Line Creek Plateau (summer/fall range) and adjoining east-facing drainages of the plateau at lower elevations (winter/spring range). Elk from a larger (approximately 250 animals) population in Wyoming, the Bennett Creek herd previously used the the same "core" winter/spring range as the Line Creek herd. Recently, the Bennett Creek and Line Creek herds have used separate winter/spring ranges. The Line Creek population has had an historically low productivity (X=36 calves/100 cows, 1977-88), but has increased 130 percent since 1977, primarily through high survival rates associated with the current management of permit-only hunting of this population.

Summer/fall home range use is concentrated on the Line Creek Plateau, particularly at the heads of three major drainages; Spring Creek, Corral Creek and Seeley Creek. Here elk congregate in large groups throughout the summer and early fall to exploit wet alpine vegetation which is abundant and persistent at these sites, but scarce in other parts of the plateau. Elk begin use of lower elevation bunchgrass-sagebrush and limberpine habitats in east-facing drainages from mid-fall to early winter, dependent on snow conditions. In an effort to improve winter range conditions for this population, the Beartooth District of the Custer National Forest began a program of prescribed burning of such habitats in 1984. Since then, five prescribed burns of approximately 500 acres have been completed. On such created sites, plant production has doubled, grass production has tripled and protein levels in plants have doubled compared to similar untreated sites. Elk use of burns has increased 150 percent compared to pre-burn levels. Additional studies have examined food habits and dietary status of the Line Creek elk herd and their response to oil drilling operations in Ruby Creek, on of the east-facing drainages.

In 1989 an oil well was drilled on Ruby Creek. Preliminary data suggest that current mitigation measures employed in the Ruby Creek drillings have so far prevented loss of elk through direct mortality or emigration. Such mitigation consists of drilling only during summer and early fall (June 15-October 15), removal of the drill rig after October 15, and limiting drilling to a single site. Since 1989, winter range use by the Line Creek herd has been concentrated in Mill Draw. This response is likely the result of an exceptionally productive plant response from a prescribed burn conducted in this drainage in 1989.

Map 4 in Appendix G indicates "core" seasonal home range areas utilized by the Line Creek herd. Additionally, Table 3.8 displays acres of "core" seasonal home ranges within both the analysis and decision areas for this project.

3.1.2.5 IMPORTANT HABITAT FOR MOOSE

Aspen and shrub dominated wetlands: Forty-nine percent of all radio-collared moose relocations occur in aspen or shrub-dominated wetland habitats, despite the fact that such areas, within McDonald Basin, constitute <10 percent of available habitat. Of five moose with identifiable core use areas, four concentrated >45 percent of all activity in the areas dominated by these habitat types. In addition to McDonald Basin, other areas with high concentrations of these habitat types include the Palisades area, Red Lodge Creek area, West Fork of Stillwater River, Little Rocky Creek, and Fishtail/Fiddler Creeks. Approximately 5,000 acres of suitable moose habitat exists in the decision area. Dominant vegetation in these habitat types can be altered by water level changes of as little as two cm.

Within the administrative boundaries of the Beartooth District seven separate moose herd units have been defined. Map 5 in Appendix G displays the locations of these mapped seasonal home ranges. Additionally, Table 3.8 displays the acres of seasonal home ranges for this herd within the analysis and decision areas for this project. Vegetative communities which make up summer/fall ranges are similar in nature to vegetative communities utilized by moose during winter and spring. The main difference being the elevational zones of these similar habitats. Generally, moose use lower elevation aspen and shrub dominated wetlands during times of snow accumulation (winter and spring). Conversely, moose use higher elevations of these vegetative communities as they become available during the summer and fall months of the year.

McDonald Basin Herd

McDonald Basin contains extensive and productive aspen and riparian (shrub-dominated wetlands) which receive heavy use by moose in winter and spring. Degree of use has varied directly with snowfall since studies began in 1988. Moose in this area are part of a population estimated at 62 moose living between the West Rosebud River and Little Rocky Creek. Based on the size of the area actually used by moose, moose densities in this population approach one moose every 1-2 square miles. Radio-collared moose are relocated in the basin more often than in any other area of equivalent size.

McDonald Basin is the single most important area of moose habitat between the West Rosebud and Stillwater Rivers for the following reasons; 1.) Extensive and productive concentrations of preferred aspen and shrub-dominated wetland communities, 2.) High concentrations of moose in the basin during winter and spring seasons.

Red Lodge Creek Herd

Studies of moose habitat use conducted along the Beartooth Mountain Face from 1988 to 1992 indicated extensive moose use in shrub dominated wetland and aspen dominated vegetative communities within the Red Lodge Creek drainage during winter and spring. Numbers of moose in the area were not estimated. Lower elevations which contained these vegetative attributes served primarily as winter/spring home range, while higher elevation shrub dominated wetlands served as core summer/fall home range.

East Rosebud, Lodgepole Creek, Palisades, West Fork Stillwater River Herds

Vegetative communities contained within each of these herd units is similar to conditions described in both the McDonald Basin herd unit and the Red Lodge Creek herd unit. All of these herds inhabit portions of the decision area on at least a seasonal basis.

Main Stillwater River Herd

Vegetation conditions described under the McDonald Basin and Red Lodge Creek herds are similar to the vegetation communities used by the main Stillwater River herd. However, these vegetative communities are not widespread within the Stillwater River canyon. The area used by this herd lies entirely within the Absaroka-Beartooth Wilderness.

3.1.2.6 IMPORTANT HABITAT FOR WHITE - TAILED AND MULE DEER

White-tailed deer are found peripherally in the decision area and are associated primarily with riparian habitat zones along streams and rivers at lower elevations. Riparian vegetation along streams provide security during the hunting season and thermal cover during the winter. Due to winter snow conditions, little or no white-tailed deer winter range is found on the Beartooth Ranger District. Within the decision area, approximately 171,000 acres of summer/fall habitat is available for white-tailed deer use. Map 5 Appendix G displays the home ranges for white-tail and mule deer. Additionally, Table 3.8 displays the acres of seasonal home ranges for this herd within the analysis and decision areas for this project.

Mule deer are found throughout the decision area during the summer season and can be found in a variety of vegetative habitat types from dry meadows at lower elevations, to subalpine meadows at higher elevations. During the winter, most mule deer migrate off the Forest onto private lands. Within the decision area, approximately 10,000 acres are considered suitable mule deer winter habitat. This is a small portion of a much larger mule deer winter range that is found on adjacent private lands (100,000 acres).

No population estimates are available for either species but approximately 600 mule deer and 200 white-tailed deer are harvested annually from Hunting District 520, of which the decision area is included. Harvest numbers include private lands as well as National Forest System lands in the decision area.

3.1.2.7 IMPORTANT HABITAT FOR BIGHORN SHEEP

Three herds of bighorn sheep (Rock Creek, West Rosebud, and Stillwater) are found within the administrative boundaries of the Beartooth Ranger District. All summer/fall ranges used by these herds are contained within the Absaroka- Beartooth Wilderness. A total of approximately 80,330 acres of bighorn sheep winter/spring home ranges have been identified within the analysis area. Of this, only 11,210 acres are located in the decision area, with the remainder in the Absaroka- Beartooth Wilderness.

During the winter West Rosebud sheep used high alpine plateaus and were restricted to small windswept areas where relatively little forage of low nutritional value was available. In April, these bighorns migrated down to the steep valley slopes along West Rosebud Creek where forage of high nutritional quality was available.

Stillwater sheep spent the winter and spring in the valley bottom using various habitat types where forage of high nutritional quality was relatively abundant. Inferior horn growth, higher lungworm larval output and high lamb mortality on the West Rosebud probably reflected these differences in range use and forage conditions on the two areas. Dried forbs dominated the bighorn's diet on the primary West Rosebud winter range. On the Stillwater, preferred grasses comprised most of the winter diet, though forbs and browse plants were also used. Grasses dominated the spring diet on both areas. Grasses, forbs and browse was the order of importance of forage classes used by West Rosebud bighorns during summer and fall.

Mule deer jointly use the same winter range habitats as bighorn sheep on the two previously mentioned areas, but there was little overlap in food habits between these two species. Mountain goats generally used the same habitat types and forage species as bighorns within summer ranges. Food habits of horses, cattle and domestic sheep overlapped significantly with those of bighorn sheep.

From 1985 to present the Stillwater sheep herd experienced a decline from approximately 60 animals, down to the current 25-30. Although the cause of the decline is uncertain, it coincided with the development of mining in the Stillwater River drainage during the mid-1980s. Displacement of animals to marginal habitats is one possibility for this decline. Shift in habitat use patterns may have put animals at a higher risk for disease and predation. In addition, currently used habitats may not provide the quality or quality of forage previously utilized.

Map 7 in Appendix G displays mapped locations of these bighorn sheep herds. Additionally, Table 3.8 displays the acres of seasonal home ranges for herds within the analysis and decision areas for this project.

3.1.2.8 IMPORTANT HABITAT FOR MOUNTAIN GOAT

Mountain goat populations, though not native to the Absaroka-Beartooth Mountains, are found at the higher elevations of the decision area, but mainly in the adjacent Absaroka-Beartooth Wilderness. These populations of mountain goats are the result of transplants dating back to the 1940's.

The preferred habitat for mountain goat is high elevation cliffs and talus slopes. The primary vegetative communities used by this species in the analysis area are whitebark pine and subalpine fir timber types, and the subalpine grass meadows.

Four populations of mountain goats occur in the Beartooth Mountains: the Line Creek Plateau herd, the Hellroaring herd, East Rosebud herd, and the West Rosebud herd. Populations are not very large and an average of only 10 to 15 animals are harvested each year from all herds combined. Most of these animals are killed at higher elevations in the Absorka-Beartooth Wilderness area, but occasionally they are harvested in the EIS decision area.

The exception to this general population status occurs within the Line Creek herd. This population is comprised of approximately 50-60 animals which use portions of the plateau both in Montana and Wyoming. Studies conducted from 1989 to 1991 indicate that mountain goats which inhabit the Line Creek plateau utilized the same habitats during most portions of the year, with minor alterations. These habitats are primarily composed of cliffs and steep rocky slopes which are >75% slopes. Goats did not exhibit a preference for aspect or elevation.

Approximately 24,500 acres of mountain goat winter/spring home range has been identified within the analysis area. Of this total, approximately 4,170 acres are found in the EIS decision area. The majority of this seasonal mountain goat home range is located on Line Creek Plateau area, the only other area within the decision area which contains goat home range is located between the East and West Rosebud canyons. All other mountain goat herds utilize home ranges (winter/spring or summer/fall) entirely within wilderness designated lands.

Map 7 in Appendix G indicates the defined home ranges for mountain goats within the analysis area. Additionally, Table 3.8 displays the acres of seasonal home ranges for herds within the analysis and decision areas for this project.

3.1.2.9 IMPORTANT HABITAT FOR BLACK BEAR

Black bears are found throughout the coniferous forest zone within the decision area. Preferred habitats are Douglas fir, lodgepole pine, spruce and subalpine fir cover types. However, other vegetative cover types are also used probably to a lesser extent such as aspen, riparian areas, brush types and occasionally subalpine meadows.

Other investigators found that bears on the Beartooth Face tended to place dens at high elevations (mean of 2239 m), northern aspects and steep slopes (20-40%). Bears selected grasses and forbs in the spring and early summer. Fall food habits were closely tied to the availability of whitebark pine and berries. Conifer-shrub types were used proportionally more than other types in analysis area. During spring and summer, female black bears consistently used habitats between 2000 and 2100 m elevation, a zone having the highest potential for the greatest habitat diversity.

No population estimates are available for black bears, but an average harvest of 67 bears per year from 1984 to 1986 is presumed to have resulted in an over-harvest of the species in this area. Since then, the bear harvest has been reduced to about half of that figure with a female harvest of only 30 percent of the total quota. Most of the bear harvest is from within the boundaries of the decision area.

Within the analysis area, bears are heavily dependent on white-bark pine and berry patches in the fall. Whitebark pine areas on the East Boulder Plateau may be especially important to reproductive females. High road densities may have an adverse effect on bears, making them susceptible to hunter take. Within the decision area, approximately 23,000 acres of whitebark pine foraging areas, greater than 1/2 mile from a road, have been identified. These areas may provide important feeding/security areas in the fall. Additionally, approximately 13,000 acres of berry producing shrubs, which serve as important foraging areas, have been identified within the decision area. Habitat conversion of conifer stands, considered important for cover and security, has been minor to date.

3.1.2.10 IMPORTANT HABITAT FOR PRONGHORN

Pronghorn antelope are found only on the extreme eastern portion of the decision area, on the east flank of the Line Creek Plateau, adjacent to the Wyoming state line. The decision area contains very little pronghorn habitat, but animals do inhabit portions of the Beartooth District. Approximately 2,700 acres of pronghorn habitat is identified in the decision area. Topography and vegetation, key factors when describing pronghorn habitat, limits the use of National Forest System lands by this species within the EIS decision area. Antelope utilizing the decision area number approximately 100 animals. Use of the decision area has been documented during all portions of the year, but occurs primarily during the spring, summer, and fall.

3.1.2.11 IMPORTANT HABITAT FOR MOUNTAIN LION

Mountain lions are found in a variety of vegetation types in the decision and analysis area, but are probably not common. Stalking habitat may be a limiting factor in the Greater Yellowstone Ecosystem. Lions are closely associated with deer populations, as this is their primary prey base. As previously discussed, he analysis area contains extensive mule and white-tailed deer habitat.

Studies conducted in Yellowstone National Park on radio collared mountain lions resulted in relocations on the Beartooth District. This seems to indicate widespread movement between habitats within the Greater Yellowstone Area. Additionally, the Montana Department of Fish, Wildlife, and Parks in conjunction with the Stillwater Mining Company has been monitoring mountain lion activities in the vicinity of the Stillwater River. Results to date indicate a high degree of mobility in both sexes of mountain lions, although males seem to roam throughout the analysis area more then females.

No population estimates are available, but harvest figures are between two to as many as 18 per year. Habitat within the analysis area does not appear to be a limiting factor for this species. Therefore, all portions of the decision area are considered habitat for this species.

3.1.2.12 IMPORTANT HABITAT FOR MANAGEMENT INDICATOR SPECIES (MIS), AND OTHER SPECIES

MIS are species identified in the Forest Plan whose population and changes to populations are believed to indicate effects of management activities on other species of a major biological community or on quality of water.

Management Indicator Species

Ruffed Grouse

Ruffed grouse are a management indicator species on the Custer National Forest for aspen dominated communities. In the Rocky Mountains, they are associated with riparian areas and deciduous forests (generally aspen). Surrounding conifer habitats are occasionally used for escape and winter cover. On the Beartooth District, ruffed grouse populations have probably declined over the last century due to fire suppression efforts. This has resulted in reduced vigor within aspen stands and increased conifer encroachment. Typically, maximum ruffed grouse population levels area associated with younger seral aspen stands. Following logging or fire, ruffed grouse will occupy these stands beginning about four years following disturbance, and will continue using these habitats until approximately year 30. Approximately, 4,470 acres of suitable ruffed grouse habitat occurs in the project area.

Northern Goshawk

The northern goshawk, an indicator species for the Custer National Forest, is widely distributed, but uncommon in the western United States. Within the analysis area, mature stands of Douglas-fir, lodgepole pine, spruce/fir, ponderosa pine and aspen communities are considered suitable nesting habitats. One nest site is known at Meyer's Creek, however suitable habitat within the analysis area exists to support several territories. Suitable habitat extends into the Beartooth/Absaroka Wilderness, adjacent National Forests, and even to southeastern Montana, where nests have been found in ponderosa pine stands. Even age harvest of conifer stands, resulting in Forest fragmentation, has been attributed to goshawk declines over portions of the species range in the western United States. Logging has not played a significant role in the alteration of conifer habitats within the analysis area.

Other Species

Blue grouse are found throughout the analysis and decision areas. Population estimates are not available. However, records supplied by the Montana Department of Fish, Wildlife, and Parks indicate that the annual average harvest of Blue grouse has dramatically declined over the last 10 to 15 years. No rationale for this population decline has been documented.

Typically, blue grouse use low elevation riparian and shrub dominated habitats during the breed, nesting and brood rearing portions of the year. Migration to upper elevation habitats, which serve as wintering grounds, begin in October and is completed by mid to late November. During the winter, subalpine fir and spruce dominated coniferous forest are extensively used by this species. During migration, douglas-fir habitat types are used.

Raptors

Golden eagles and prairie falcons are two raptor species that may potentially be affected by oil and gas related exploration, development, and production activities.

Considerable cliff strata exists in the decision area with Bad Canyon, Line Creek, and the Shoshone face representing the best habitats for such cliff nesting raptors as the golden eagle and prairie falcon. An estimated 29,340 acres of cliff habitat suitable for these species is found in the analysis area. Active nests for both the golden eagle and the prairie falcon have been found in the study area.

Furbearers

Habitats considered suitable for **marten** are pole size and larger stands of subalpine fir, spruce, lodgepole pine and Douglas-fir. Riparian communities, including deciduous hardwoods are used as travel corridors. Within the decision approximately 160,000 acres are considered suitable for marten.

Previous estimates indicate that 250+ martens were trapped in the Greater Yellowstone Ecosystem. Marten are highly susceptible to trapping, and can be trapped out in areas where there are high road densities.

Wolverines are considered widely distributed but rare within the Greater Yellowstone Ecosystem. Habitats on the decision area gradate into similar habitats in the Absaroka-Beartooth Wilderness, Yellowstone National Park and the adjacent Gallatin and Shoshone National Forests. Wolverines were historically found in the Greater Yellowstone Ecosystem but were nearly extirpated by the early 1900s.

Suitable habitat in the Greater Yellowstone Ecosystem include alpine areas associated with spruce and subalpine fir. Winter areas are associated with riparian habitats along streams in close proximity to ungulate winter ranges. The majority of summer habitats are located in the Absaroka-Beartooth Wilderness Area. Subalpine fir/spruce, lodgepole pine and riparian vegetation cover types provide continuity with lower elevation riparian areas that may be used in the winter.

Wolverines are considered vulnerable to trapping, poisoning and habitat degradation from logging and heavy human use. Most of the habitats considered suitable for wolverine summer use are associated higher elevation sites and have not been subject to high levels of human use. Heavy historic human use related to mining exploration, and current recreation use at lower elevations may have reduced the suitability of these habitats for wolverine winter use. Fire suppression has significantly altered structure and spatial distribution of vegetation communities. Habitats are currently at risk for large stand replacement type fires that occurred in the Yellowstone Ecosystem in 1988. Timber harvest on the Beartooth District has not been a significant factor in the alteration of habitats in this area.

3.1.3 NATURAL SETTING (Issue #3)

3.1.3.1 VISUALS

The goal of visual resource management is to maintain the overall natural appearing landscape recognizing that there are some areas that will be affected by management activities (Forest Plan, 1987, pg. 4). Visual quality is addressed as a part of an overall management strategy and is described as visual quality objectives (VQO's) prescribed for specific areas based on the type of management and other factors. VQO's are derived from integration of landscape variety classes, sensitivity levels, and viewing distance zones. They range from retention of the natural landscape to maximum modification (See Glossary for definitions of VQO's). The visual quality objectives for critical viewsheds in the analysis area are shown in Table 3.9 and identify the direction in the Custer Forest Plan.

In the decision area, changes in the landscape from human activities include the Beartooth Highway and associated development, scattered mining developments including access roads, developed campgrounds, some timber harvest, the downhill ski area, and some areas of prescribed burns for wildlife habitat improvement. Scattered throughout the lower elevations are a few small isolated recreation developments. The majority of the area is mostly natural-appearing when seen from the sensitive travel routes and use areas.

In some cases, one visual quality objective is identified for a management area. In others, a range of objectives from retention to modification is identified. In this case, the objective used is that which was determined by the Visual Management System Inventory completed for the Beartooth Face Planning Unit in the late 70's, as long as it is consistent with the intent of the management area direction.

The forces that shaped the scenic quality of the analysis area are the same as those described in section 3.1, Geology, Soils, and Vegetation. These forces created a landscape that is diverse and highly scenic.

The analysis area is within the Yellowstone Rockies Subregion character type. Subregion landscape character types are areas with similar visual characteristics of land and rock forms, vegetation, and water which combine to create a certain visual image. The Yellowstone Rockies present a diverse range of landscapes - from the high rugged peaks of the Absaroka Range, to the moderate slopes of the Pryors, to the semi-desert drylands that fall in between.

The analysis area is primarily in the rugged Beartooth Mountains which are high and were extensively glaciated. The mountain peaks within the area are the highest in Montana, including Granite Peak at 12,799 feet. There are permanent snowfields and a few glaciers in the higher elevations. The valleys are narrow and deep with valley floor elevations at 6,000 to 6,500 feet high. Rocklands are an important feature, with deep, narrow canyons, vertical rock walls, and massive rock outcrops evident along the Beartooth Highway and in the East and West Rosebud drainages. See Map 2 in Appendix G of the area that contains slopes exceeding 40 percent within the decision area.

Vegetation is as diverse as the land and rock forms. Low growing vegetation covers the foothills, but quickly gives way to the continuous forest cover of the moist mountainsides. Steep, rocky, or drier slopes present open, treeless, or thinly-timbered areas, and vertical avalanche paths cut visible swaths through trees below snow collection zones. Islands of deciduous vegetation introduce new patterns and colors in the landscape as they work their way into the Forest, while higher elevations contain a variety of sedges, forbs, and grasses interspersed with bogs and swamps.

Water is also an important element in the Beartooth landscape, where cirque lakes with their characteristic rounded form, and glacial lakes with their irregular shorelines and reflective character are numerous. A few long narrow impoundments occur where dams have been built in some of the canyons, such as Mystic Lake and Emerald Lake. Many of the wilderness access routes follow drainages with clear streams and water-associated vegetation.

Since at least the early 1900's, residents in the Red Lodge area have recognized the outstanding scenic qualities of the neighboring Beartooth Mountain Range (Red Lodge Chamber of Commerce, pamphlet on the Beartooth Highway). In recognition of those visual values, the Beartooth Highway was classified as a National Forest Scenic Byway in 1989. In 1978 a large part of the Beartooth Mountains were included in the Absaroka-Beartooth Wilderness, which is the most heavily used wilderness in Montana. The relief of the Beartooth Mountains makes the perimeter of the decision area visible for long distances from all major approach routes.

Since the decision area is large and spread out, it can be viewed from a number of directions and at a variety of travel speeds and duration of time. The viewers also vary, from local ranchers, residents, and recreationists to tourists visiting the area strictly to enjoy the scenery. Many local residents have consciously chosen the area for its quality of life and proximity to recreational opportunities, both of which depend largely upon the outstanding natural appearing landscape.

Specific areas or landscapes analysed include the viewsheds that are directed toward the Beartooth Face from the following major highways:

- Montana State Highway 212 from Joliet to Red Lodge
- Montana State Highway 78 from Absarokee to Red Lodge
- Montana State Highway 308 from Red Lodge to Belfry
- Montana State Highway 72 from Belfry south into Wyoming

There are a few designated viewpoints along these highways and most of the decision area is seen as middleground (from 0.5 to 3-5 miles) and/or background (greater than 3-5 miles). Important views from routes that lead to the Absaroka-Beartooth Wilderness include East and West Rosebud Creeks, West Fork of Rock Creek, West Fork Stillwater River, and others. The Beartooth Highway through the southern portion of the decision area provides foreground and middleground views. There are also several viewpoints and scenic vistas along this highway.

In addition to these major highways, other important views within the decision area include: Red Lodge Ski Area, Silver Run X-C Ski Area, several Forest Service Campgrounds, Timbercrest Girl Scout Camp, Spring Creek area, lakes adjacent to the Wilderness, Burnt Mountain, Mt. Maurice, Grizzly Peak, and the series of plateaus such as Line Creek, Fishtail, and Stillwater.

During public scoping, many concerns were voiced about how alterations to the landscape might be seen not only from the approach routes to the Wilderness but also from locations popular for recreation within or adjacent to the Wilderness. These concerns included alterations visible during the day or night, such as lights or flares, and those that are temporary, such as drill rigs or trucks.

TABLE 3.9
Visual Quality Objectives for Example Areas

Area	Objective
Beartooth Highway	Retention in the foreground, Partial Retention in the middleground
East Rosebud Creek Road	Retention in the foreground
West Rosebud Creek Road	Retention in the foreground
Montana State Highway 78	Partial Retention in the middleground and background
West Fork Rock Creek Road	Retention in the foreground, Partial retention in the middleground
Montana State Highway 72	Partial Retention in the middleground and background
Stillwater River Road	Retention in the foreground, Partial Retention in the middleground

3.1.3.2 SOUND

Sound levels and types vary through-out the decision area, ranging from campgrounds, picnic areas, roads etc., where sound is created by visitors and traffic, to more natural sounds including wind, streams, and animals. These sounds will decrease or increase in volume at any particular area, depending on many different factors including tourist traffic and weather patterns (wind direction and velocity, precipitation, etc.).

3.1.3.3 ODOR

Natural odors vary throughout the decision area, depending on a number of factors, including climate and season. Odors originating from humans occur around public high-use areas such as campgrounds and picnic areas. Examples include odors from cooking, sanitary facilities, and vehicle exhaust.

3.1.4 RECREATION RESOURCES (Issue # 4)

The goal of recreation management is to provide a broad spectrum of recreation opportunities for the benefit and enjoyment of the public, with due consideration for other Forest uses and resources (Forest Plan, 1987, pg. 4).

The Beartooth Ranger District receives the highest level of recreation use of any Ranger District on the Custer National Forest (USDA-FS 1987a). Available estimates indicate that there are approximately 550,000 recreation visitor days (RVDs) in the Beartooth Unit each year (USDA-FS 1985).

The Beartooth Mountains provide diverse recreation opportunities, including developed camping and picnicking, pristine Wilderness, stream and lake fishing, individual and guided hunting, hiking, mountain bike riding, horseback riding, nature observation and photography, downhill and cross-country skiing, snow shoeing, snowmobiling, and other activities in both developed and dispersed recreation settings. One of the most visible and well known areas on the Beartooth Ranger District is the Beartooth Highway, which provides seasonal access to Yellowstone National Park. The accessibility of Yellowstone National Park and the proximity of Billings, Montana, the state's largest population center, contribute to the high level of recreation use.

The Forest Service maintains 16 developed campgrounds within the analysis area. Sheridan, Ratine, Parkside, Limberpine (2), Greenough Lake, and M-K campgrounds are in the Rock Creek drainage adjacent to the Beartooth Highway. Other campgrounds are Pine Grove, Emerald Lake, Sand Dunes, Jimmy Joe, East Rosebud, Palisades, Basin and Cascade. Red Lodge Mountain Ski Area near the town of Red Lodge is a seasonal high-use area which is open about 138 days per year, with approximately 1,800 users per day. The 1992 season saw approximately 101,237 users. Lions, Westminster Spires, and Timbercrest organizational camps are in the Rock Creek drainage and recreation residences are located along the West Rosebud, East Rosebud, West Fork of Rock Creek, and the Main Fork of Rock Creek. See Map 6 in Appendix G.

Dispersed recreation is concentrated west of the scenic highway where several trails provide access into the Absaroka-Beartooth Wilderness. Less dispersed recreation uses such as hunting, hiking, and backpacking occur on the Line Creek Plateau east of the highway. The analysis area also includes the East Rosebud, Stillwater, Rock Creek, Lake Fork of Rock Creek and West Fork Rock Creek. These streams are all proposed for recreation river status under the Wild and Scenic Rivers Act. See Map 6 in Appendix G.

The Forest Service estimates approximately 75 percent of the recreation use comes from Stillwater, Yellowstone, and Carbon Counties. Survey data collected from 61 recreationists along the Beartooth Highway during the 1988 July 4th weekend indicated that of this group, nearly 80 percent of campground users, 60 percent of backcountry users, and 41 percent of motorists stopping at highway overlooks were from the Billings area and one-third of backcountry users were from the Red Lodge area. Additional discussion of the economical effects from tourism are discussed in the section titled 3.1.8 Economics.

3.1.5 CULTURAL RESOURCES (Issue # 5)

The goal of cultural resource management is to maintain and enhance historic and prehistoric cultural resource values. Conservation of archaeological and historic sites and information for research, public interpretation, and use by future generations is emphasized (Forest Plan, 1987, pg. 4).

Including sample survey data done specifically for this analysis with the existing inventory data, 59 recorded cultural resource sites are located within the decision area. These are sites that could be affected by oil and gas development. Fifteen of these sites are historic, 35 are prehistoric, and nine may have traditional values.

The National Register of Historic Places is the national inventory of significant historic resources maintained by the Secretary of Interior. Cultural resource sites that meet criteria for listing on the National Register are considered "historic properties". This National Register District is not administered by the Forest Service, but any effects, direct or indirect, attributed to a Forest Service decision on a National Register site must be considered.

Currently nine sites in the decision area are eligible to the National Register and include Wild Bill Lake; Ranger Stations in Rock Creek, Line Creek, and Meyers Creek; the Mouat Mine; West Rosebud site; and Camp Senia, the movie site, and the Blitz Ridge site.

Well documented archaeological information for much of the analysis area is currently lacking, but preliminary investigations indicate the area may be rich in cultural resources. Information accumulated to date demonstrates a long and diverse series of human occupation spanning the last 10,000 years. Cultural resource sites include prehistoric hunting camps, vision quest sites, tipi rings, rock cairns, Ranger stations, mining towns, lime kilns and dude ranches.

Cultural resource inventory work has been conducted as required by the 1966 National Historic Preservation Act (NHPA) and implementing regulations found at 36 CFR Part 800. District records show that 4,600 acres have been inventoried for cultural resources as of Spring of 1992. These inventoried areas were conducted at a project specific and limited scale, primarily for Mystic Dam, mineral development in the Stillwater Complex, and recreational trail development. A total of 75 cultural resource sites, representing 11 different site types, are already recorded within the analysis area, with 47 of these within the decision area. The most common prehistoric site type is lithic scatters and the most common historic site is related to mining activities. Table 3.10 describes the decision area sites, type, age, and eligibility to the National Register of Historic Places (NRHP). Following is a summary of prehistoric and historic sites found in the decision area to date.

TABLE 3.10
National Register of Historic Places Site Status

MGT AREA	SITE NAME	ELIGIBLE	NOT ELIGIBLE	ELIGIBILITY UNDETERMINED	MANAGEMENT AREA
24CB00037	Aspen Flats			X	C LINE CREEK
24CB00046	Wild Bill Lake	X			R WEST FORK ROCK CREEK
24CB00409	Lost Picket Pin Creek			X	T SCENIC BY-WAY
24CB01191	CNF90-4			X	T SCENIC BY-WAY
24CB01195	CNF90-1			X	T SCENIC BY-WAY
24CB01198	Rock Creek Ranger Station	X			P ROCK CREEK
24CB1292	Scaleer Shack	X			R WEST FORK ROCK CREEK
24CB1293	Lime Kilns	X			R WEST FORK ROCK CREEK
24CB1296	Friday PM Site			X	C LINE CREEK
24CB1294	Snow Camp Cabin			X	F ROCK CREEK
24CB1297	Line Camp			X	D LINE CREEK
24PA00881				X	C COOKE CITY
24PA00882				X	C COOKE CITY
24PA00883				X	C COOKE CITY
24PA00885	L-19			X	C COOKE CITY
24PA00877	McLaren New Years Gift Mine			X	C COOKE CITY
24PA00889	Bare Mountain			X	C COOKE CITY
24PA00890	Mountain Goat-M4			X	C COOKE CITY
24ST00017	Horseman's Flat Cairn			X	D PICKET PIN
24ST00024				X	D PICKET PIN
24ST00035	Cold Creek			X	F WEST ROSEBUD
24ST00056				X	C PICKET PIN
24ST00060			X		E STILLWATER
24ST00061				X	E STILLWATER
24ST00062			X		E STILLWATER
24ST00070			X		E STILLWATER
24ST00099		X			E STILLWATER
24ST00100	Blitz Ridge Site	X			E STILLWATER
24ST00218				X	E STILLWATER
24ST00219	Murphy Ditch		X		D PICKET PIN
24ST00220	Benbow Mill		X		B LITTLE ROCKY
24ST00221	Benbow Mine		X		E STILLWATER
24ST00222	Mouat Mine and Mountain View	X			E STILLWATER
24ST00232	CNF90-2, Mystic			X	F WEST ROSEBUD
24ST00233	CNF90-3, Mystic			X	F WEST ROSEBUD
24ST00234	Myers Creek Ranger Station	X			P MYERS CREEK
24ST00651	West Rosebud Lake Site	X			F WEST ROSEBUD
4ST00653	North Mystic Lake			X	F WEST ROSEBUD
24ST279	Whittaker Homestead			X	B BAD CANYON
24SW00056	Swamp Creek			X	C STILLWATER
24SW00057				X	C STILLWATER
24SW00059	Pass Creek			X	D PICKET PIN
24SW00060	Rock Blind			X	C PICKET PIN
24SW00061	Castle Lake			X	C STILLWATER
TOTALS:		9	6	29	

3.1.5.1 PREHISTORIC SITES

The analysis area has hosted a long and diverse series of human occupations characterized by the cultural remains of small, mobile, hunting and gathering groups who entered the area at the beginning of the Holocene Period (12,000 to 10,000 years ago). These people are referred to as Paleo Indian and subsisted on now extinct mammoth and bison. Although glacial and periglacial environments in the Beartooth mountains may have erased or inhibited earlier occupation, surface and excavated data from a site at Red Lodge (Beckes and Keyser 1983, pg. 327), and the Waples collection (Husted, personal communication) support the assumption of Paleo Indian use of the Beartooth. For example, the 1991 find of a constricted stem point in the Lake Plateau area of the Absaroka-Beartooth Wilderness indicates groups of Paleo Indian hunters and gatherers occupied the full environmental range of the area from foothill, to mountain valley, to high altitude plateau.

Following the Paleo Indian period, the hunter and gatherer groups shifted the hunting emphasis to a wider range of plants and animals and by 9,500 to 9,000 years ago these groups had established a successful subsistence pattern that would persist well into the 18th century. This more generalized subsistence pattern is referred to as the Archaic Period and has been subdivided into Early, Middle and Late Periods distinguished by changes in cultural material such as projectile points.

The Early Archaic period is associated with a 2,000 year "drought" referred to as the Altithermal climatic episode. The Altithermal is believed to represent drier conditions for the High Plains, with a possible increase in human occupation of mountainous regions and accompanying decrease in occupation of plains regions.

Observations by Haines (1963, pg. 13) suggest that the occupation and use of high mountain areas north of Yellowstone Park occurred primarily during the Early and Middle Archaic, and was limited to the park-like areas above an elevation of 8,900 feet. Based on the study of glaciation by John Good, Haines further asserts that the ice of the Pinedale phase of the Pleistocene did not cover the high ridges, but left them exposed as islands which were possibly havens for early people (Haines 1963, pg. 2). Plateaus and ridges above 8,900 feet in areas such as Line Creek and Bad Canyon may contain information pertinent to this prehistoric period.

Husted hypothesizes that an early culture that originated as bison hunters on the plains moved to the higher elevations during the Altithermal, and remained to develop a distinctive culture adapted to mountain habitat. Results of the 1990 investigations suggest that the Beartooth may have harbored a substantial population during the Altithermal, using the higher regions during the summer months and moving to the lower valleys and foothills for the winter.

Preliminary evidence in support of Early Archaic occupation in the Beartooths has been found in surface collections from five sites, two of which are located in the decision area. The environmental range of these sites suggest occupation in the mountain valleys along lakesides, and along the higher plateau areas.

The Middle Archaic is tentatively identified by surface material from three sites and conclusively identified in excavations conducted at the West Rosebud site. Evidence from this site supports the hypothesis that small groups of middle archaic foragers exploited mountain meadows and canyons for short periods from late spring to early fall. The West Rosebud site is along one of the few good routes between the Stillwater River Valley and the Beartooth Plateau (Beckes and Keyser 1983, pg. 332), and may have been one of the few corridors used by hunters and gatherers for travel from the plains to the plateau.

The Late Archaic is evidenced by surface collected artifacts from 6 sites in the decision area. Late Archaic aged sites are located not only in the mountain valleys but on high mountain divides such as Blakely-Brownlee in the northwest part of the decision area.

The Late Prehistoric/Protohistoric period was a time of population movements, technical change, and social interaction. About 1700 A.D., horse-adapted tribes such as the Crow, Sioux, Cheyenne, and Blackfeet moved into the area. Historic occupation of the area indicates the presence of Shoshonean speaking populations, but how and when these groups settled in the area is subject to continuous debate.

There are numerous references in early accounts of Yellowstone Park and the Beartooth range to the "Sheepeaters", but very little is known about these people or their origin. The Sheepeaters, or Tukuarikas, are thought to be a mixture of Shoshoni "walkers" and Bannock mountain dwellers who resided within Yellowstone Park, the Absaroka Range, and the upper slopes of the Wind River Mountains. The name "Sheepeaters" is taken from the fact that Rocky Mountain bighorn sheep was their principal source of food. They were considered to be the "have nots" of the Shoshoni-Bannock culture, lacking horses and guns, and living in shelters made of brush and poles called wickiups. It is believed that the last of the Yellowstone Sheepeaters left the Park around 1879, joining with the Shoshoni on the Wind River Reservation at Chief Washakie's invitation.

Late Prehistoric components similar to the stone points used during this period have been located at six sites in the area. Most of these are campsites that have been reoccupied throughout time and are located along the mountain valleys and high plateau environments.

Crow movement from the Hidatsa groups along the Middle Missouri into the Beartooth area has been well documented by archaeologists and linguists as well as Crow oral history (Beckes and Keyser 1983, pg. 338). By the nineteenth century the Crow occupied the country from the Yellowstone River southward into Wyoming between the Powder River and the Absaroka-Wind River mountain chain. By 1875, the Crow Agency was located south of the present town of Absorkee, on the west bank of Butcher Creek near it's confluence with the East Rosebud River.

3.1.5.2 HISTORIC SITES

The entire Beartooth Mountains were originally assigned to the Crow tribe as Indian land by the Fort Laramie Treaty of 1851. In 1875, the Crow Agency was located south of the present town of Absarokee, on the west bank of Butcher Creek near the confluence of the East Rosebud River. The agency was headed by Major Armstrong and was used for eight years until it was moved in 1883 to its present site along the Big Horn River. This move did not mean that the Crow abandoned this territory, however, and accounts indicate that they returned annually to gather berries, trap, hunt and gather their "medicine" (Ibid 1985, pg. 129). Based on similarities to sites reported in the literature, a series of rock features/alignments found on a high isolated ridge above the Stillwater is possibly associated with the Crow (Lahren 1980, pg. 39).

In 1880 a treaty was signed that surrendered all land north of the Yellowstone, followed a year later by an agreement to reduce the western border of the reservation to the Boulder river and cede large portions of the Beartooths along the headwaters of the Clarks Fork. Pressure from white homesteaders, miners, and the railroad further reduced the Crow domain. The present borders of the reservation were established in a treaty of 1891. This opened the area of the Beartooth to settlers and miners.

The Yellowstone Park Timber Land Reserve was created in 1891, the same year as the Crow Treaty was signed, and set aside a vast area of land surrounding Yellowstone National Park. In 1903, the Absaroka Forest Reserve and Yellowstone Forest Reserve were created, embracing all the Beartooth area. These reserves were further divided into six Forests, including the Beartooth National Forest. In 1932, the Beartooth National Forest was renamed the Custer National Forest. Historic Rock Creek, Line Creek, and Meyers Creek Ranger Stations are located within the analysis area.

Settlement of the area began as early as the 1870s when an active copper smelter operated on the upper Stillwater River, and mining claims were staked around Cooke City. Coal mining led to the establishment of Red Lodge and Bear Creek. Support resources needed for these towns were found in the Beartooths: limestone, timber, water, and food. Lime kilns, reported to operate from the late 1880s until 1910 when cement came into use, have been recorded along the West Fork of Rock Creek (Clark 1982, pg. 16). Timber harvest boomed in response to needs of the local economy. A scaler cabin located further up the West Fork of Rock Creek is associated with timber cut to supply mine timbers, cord wood for kilns, fencing, lumber, and fuel to Red Lodge.

By the mid 1880s, a mail route was established up the Stillwater all the way to Cooke City, and the Meeteetse Trail from Cody, Wyoming to Red Lodge was established. Along this trail some of the first cattle were driven into the Rosebud and Stillwater valleys in 1888 (Clark 1982, pg. 15). The trail was replaced by the Burlington Missouri Railroad in 1901.

The New World Mining District was established in the Cooke City area in 1882 and the gold area was legally opened to settlement following the 1891 land cede from the Crow. Cooke City experienced extensive hard rock mining operations from the late 1870s, with 1884-1894 and 1916-1929 the peak years of production (GCM 1990, pg. 4). Recent inventory work conducted in association with expansion of the mines recorded one mine, the McLaren New Years Gift Mine, within the analysis area. This mine was in operation from 1933 to 1953 and produced gold and copper.

Copper, nickel, and chromium deposits were found in the Stillwater River Drainage in 1882 by Jack V. Nye and Jonas Hedges at Mountain View, Benbow, and Initial Creek (GCM 1990, pg. 8). Serious development of these mining properties started in 1886 by the Stillwater Mining Company, Minneapolis Mining and

Smelting Company, and Nicollet and Hennepin Mining Company, but most claims failed to produce marketable ore.

The onset of World War II brought on a demand for chromite, a strategic metal. The Anaconda Minerals Company, as agents of the Federal Government, built the Benbow and Mouat mining complexes. Shortly after production began, however, the project was cancelled when in 1943 the war turned in favor of the Allies and cheaper, higher grade sources were used. Recorded cultural sites associated with the Stillwater mining ventures within the decision area include the Nickel, Benbow Mill, Mouat Mine, Mountain View, associated mine shafts, powder houses, and mining debris.

Recreational possibilities were recognized as early as 1891 when Major Henry J. Armstrong, former Indian Agent at Absarokee, gained a patent to the land around East Rosebud Lake for a summer home. In 1911 a road was constructed to the lake and a large log hotel was built as a resort area. This hotel is still in operation today. Wild Bill Kunster built the first resort in the Beartooths in 1902 along the West Fork of Rock Creek, where he built a dam, heated swimming pool, dance floor, and picnic area.

Dude ranches and recreational lodges were later built on ceded lands within the Forest Boundary. Camp Senia, built by Alfred Croonquist in 1917 as a dude ranch, was the earliest property developed for that purpose in the area - a novel idea at the time (Zupan and Owers 1979, pg. 280). This site and related structures in the valley was designated a National Historic District in 1989 for its architectural, historical, and aesthetic qualities.

The Beartooth Highway was constructed in 1932-33. It follows the portions of the 1883 trail blazed by E. E. Van Dyke across the high country to Red Lodge, as well as parts of the trail General P.H. Sheridan used the same year during his explorations of the Beartooth Plateau. Rock monuments marking the Van Dyke trail can still be seen along the highway (Clark 1982, pg. 18).

Mystic Lake Dam and power plant was constructed in 1924 to provide energy to residents of the Beartooth front. The construction eradicated the West Rosebud falls, enlarged Mystic lake to its present shores, and produced a 15-mile road from Red Lodge to provide access and transportation of supplies to the contractors.

In 1941, the Custer National Forest issued its first ski permit to Red Lodge Winter Sports Association to operate the Willow Creek ski area. This ski area consists of a half-mile run, two rope tows and a warming hut (Zupan and Owens 1979, pg. 226). The current Red Lodge Ski Area, formerly known as Grizzly Peak, opened in 1956.

3.1.5.3 TRADITIONAL USE AND TRADITIONAL CULTURAL SITES

The Forest Service makes land-use decisions which may limit the use of the lands over which it has stewardship. The effect these decisions may have on American Indian traditional use must be considered as directed by the American Indian Religious Freedom Act, PL 95-341. The Archaeological Resources Protection Act of 1979 also specifies that Federal land managers must notify in advance the appropriate Indian tribe if a permit issued under the Act may result in harm to any religious or cultural site.

While numerous tribes used the analysis area in the past, the Crow and the Shoshoni have expressed interest and concern regarding activities in the area. The analysis area was Crow reservation land until 1891, and was visited and utilized for years afterwards by the Crow people. Stands of lodgepole pine, cedar, and sweetgrass may still be collection localities. All of the Beartooth Mountains were important for hunting, fishing, and root gathering to the Shoshone-Bannock tribes. The rugged, remote, and isolated terrain of the decision area may provide highly suitable locations for fasting and praying by all three tribes (Deaver and Manning 1991, pg. 5).

Certain landforms and locales bearing names which relate to Indians and their traditions may indicate areas used by tribal groups. The area has a number of creeks, lakes, and mountains named after Native Americans and their traditional activities. Although most are within the Absaroka-Beartooth Wilderness, a few, such as Teepee Creek, Teepee Draw Spring, Red Lodge Creek Plateau, and Wapiti mountain are located in the analysis area.

A National Park Service technical bulletin (#38) provides information and advice on considering traditional cultural sites. If these sites meet the National Register Criteria they must be considered under the National Historic Preservation Act (NHPA). Six previously recorded sites (24ST17, 24CB36, 24SW60, 24ST61, 24ST99 and 24ST100) have been identified in the ethnographic overview contracted by the Custer National Forest as potential traditional cultural properties which may have importance to American

Indian people (Deaver and Manning 1992, pgs. 4, 110).

Deaver and Manning also identified a possible archaeological site along West Rosebud Creek that may have been used by the Crow during reservation days. Archaeological investigations conducted at the site revealed the area was used as a campsite where berries and other plants were gathered and processed. The site was used a number of times over the last 6,000 years. Further consultation with the Crow and Shoshoni concerning the possible traditional cultural sites and other traditional contemporary uses is ongoing. Decisions regarding this consultation will be included in the Record of Decision.

3.1.5.4 CULTURAL RESOURCES SURVEYS AND RESULTS.

The Forest Plan states that "analytic surveys for improvement of the cultural resource data base, in support of oil and gas area development and for site distribution modelling, will be made".

Under this direction, the Forest conducted a stratified sample survey for the decision area. The survey area was selected using two criteria: 1) areas identified geologically as possessing a high or moderate potential for occurrence of oil and gas; and 2) areas of less than 20% slope. This method identified locations most likely to be developed and where cultural resources were mostly likely to be found in place. Thirty-two observations over 5,120 acres were recorded, which covered all environmental zones within the survey area.

The inventory resulted in discovery of 12 sites and one isolated find. Sites ranged in age from early archaic to early 20th century. Sites included eight lithic scatters, an historic sheepherders' camp, three rock features, and one possible Native American ceremonial locale. Of particular interest was a locale where elk horns were found embedded in a mature Ponderosa pine tree. Similar locales in Wyoming where ram skulls were placed in forks of trees are adjacent to game drives, and attributed as possible evidence for shamanistic activity in preparation for communal mountain sheep drives.

Of the 32 observations, three (10.6%) produced cultural resources, for a site density of one per 426 acres. This can be considered a low density until considering that ten of the sites are located in an environmental zone which comprised only nine percent of the survey area. This zone is on alpine turf plateau areas covered with dry alpine vegetation. Only one site was located along creek corridors, although sample units were located in East and West Rosebud, West Rock Creek, and Rock Creek.

The predictive model developed through this survey confirmed data gathered from field inventory, and spatially depicted areas of high, moderate, and low probability for site location. Two environmental zones were identified: 1) areas within the alpine turf land type unit, with dry alpine vegetation cover type; and 2) areas within the grassland land type with grassland vegetation cover type. These two zones occur on 2,360 acres (12 percent) of the survey area. Areas with moderate probability of site locations constitute 3,880 acres or 20 percent of the survey area. Areas not containing any of the environmental zones constitute 13,620 acres (69 percent) of the survey area.

3.1.6 ROADLESS AND WILDERNESS (Issue # 6)

The goal of Wilderness management is to promote and perpetuate the Wilderness character and values of the area in accordance with the 1964 Wilderness Act, protect the environment from the impacts of humans, and let the ecosystems evolve without the impacts of humans (Forest Plan, 1987, pgs. 4 & 69). Since Wilderness area boundaries are initially defined to include whatever buffer zone from nonwilderness is needed, no additional buffer zone is delineated in this analysis. None of the alternatives in this analysis proposes entering Wilderness. For this reason, there will be no direct impacts to Wilderness from oil and gas activities, and this issue is not carried forward in this analysis. Indirect impacts will be assessed under the affected resource (such as wildlife).

3.1.6.1 ROADLESS AREAS

Within the analysis area seven roadless areas were identified during the second Roadless Area Review and Evaluation (RARE II). See Map 2 in Appendix G.

TABLE 3.11
Summary of RARE II Areas

Roadless Areas	Total Acreage	Decision Area	Adjacent Forests
# 01912 Beartooth	5,900	1,210	4,690
# 01368 Black Butte	810	810	
# 01364 Burnt Mountain	6,720	6,720	
# 01366 Fishtail-Saddleback	16,690	16,690	
# 01911 Line Creek Plateau	133,480	24,710	108,770
# 01371 North Absaroka	181,760	16,210	165,550
# 01363 Red Lodge Creek-Hellroaring	15,980	15,980	
# 01913 Rock Creek	100	100	
# 01369 West of Woodbine	1,480	1,480	

3.1.6.2 WILDERNESS

The Custer National Forest administers 339,840 acres of the Absaroka-Beartooth Wilderness, all of which is included within the analysis area. This Wilderness is highly scenic with spectacular peaks and plateaus, interspersed with hundreds of high elevation lakes. Rock Creek, West Fork of Rock Creek, East Rosebud River, West Rosebud River, Stillwater River and West Stillwater River canyons or drainages provide access into the steep northeastern slopes of this area. Trails lead to high plateaus, where much of the country is over 10,000 feet above sea level including Granite Peak, the highest point in Montana, at 12,799 feet.

3.1.7 QUALITY OF LIFE (Issue #7)

In a broad sense, quality of life can be considered a function of public health and safety, population demographics, and attitudes, beliefs and values. Employment, employment opportunities, and community services and facilities, while they are integral to quality of life, are considered in the discussion of "Economic Stability and Revenues" (Section 3.1.8.1).

The quality of life discussion considers primarily Carbon and Stillwater Counties, Montana, and secondarily, Park County, Wyoming, since the populations of these three counties are the ones most likely to be affected by the decisions originating from this document. Park and Sweet Grass County, Montana, and the communities of Cooke City and Big Timber are not addressed because the Reasonably Foreseeable Development Scenario (Appendix A) indicates that it is very unlikely oil and gas activity will occur in these counties during the expected life of any decisions originating from this analysis. Therefore no measurable influence on this portion of the analysis area is expected.

Demographic data discussed in the following section is derived from the U. S. Census Bureau, 1992a, table 1, unless otherwise noted. This discussion considers Carbon and Stillwater Counties, Montana, and Park County, Wyoming, since the populations of these three counties are the ones most likely to be affected by the decisions resulting from this analysis. Park County, Montana, and the community of Cooke City are not addressed, because the Reasonably Foreseeable Development Scenario (Appendix A) indicates that it is very unlikely oil and gas activity will occur in this county during the expected life of any decisions resulting from this analysis. Therefore no measurable influence on this portion of the analysis area is expected.

3.1.7.1 TRANSPORTATION

Roads identified in Appendix B which would receive reasonably foreseeable changes in traffic volume are Highway 212, 78, 419, Forest roads 141, 71, and 346. Highway 212 currently receives large volumes of vehicle traffic including passenger cars, farm equipment, and eighteen wheel tractor/trailer combinations. Highway 78 is traveled by the same type of vehicles but is used much less frequently compared to Highway 212. Reasonably foreseeable new road construction (0.35 miles) and road reconstruction (4.7 miles) are discussed in Appendix A and B.

All existing and proposed roads must conform to accepted National and State engineering standards for safety which includes such items as design speeds, load limits, and carrying capacity. The design of roads, bridges, and other structures needed by potential leasees must conform to these requirements. At the Application for Permit to Drill stage, Forest Service and oil company engineers will work with County, State, and Federal highway engineers to assure the roads and bridges, required to access the lease, meet all applicable standards and requirements to ensure public safety.

3.1.7.2 DEMOGRAPHICS

TABLE 3.12
Affected Area Population Statistics, 1980-1990

County/Community, State	1980 Population	1990 Population	% Change
Carbon County, MT	8,076	8,080	+00.0
Red Lodge	1,896	1,958	+03.3
Stillwater County, MT	5,598	6,536	+16.8
Columbus	1,439	1,573	+09.3
Absarokee	1,407	1,914	+36.0
Park County, WY	21,639	23,178	+07.1
Cody	6,790	7,897	+16.3

Carbon County

Table 3.12 displays a "no growth" situation for Carbon County and Red Lodge from 1980 to 1990 (Krannich, R.S. and S.E. Daniels, 1989, pages G-1 and G-4). Females comprise 52.0 percent of the population and males 48.0 percent, and the current population density is 3.9 people per square mile.

Demographics show the following population trends. The population of Carbon County is 99 percent Caucasian. Census statistics indicate that the County contains three persons of African-American descent, 42 American Indian tribal members, 17 persons of Asian and Pacific Island descent, 90 persons of Spanish-American descent, and 41 persons classified as "Other Races" (U.S. Census Bureau, 1992a, Table 3). Many of the Caucasian residents are descendants of late 1800 and early 1900 European immigrants. These early settlers were made up of two distinct groups; miners and rancher/farmers (Gold, 1976, p.32).

Carbon County population is markedly older than that of the state as a whole, 38.5 years as compared to 33.8 years. Persons 65 years of age and older account for 19.0 percent of the population compared to 13.3 percent total Montana residents.

Stillwater County

Two factors appear to be responsible for the population growth in Stillwater County. The first is the urban-to-rural migration which was prevalent throughout many areas of the United States in the 1970's, and the other is the development of the Stillwater Mine in the 1980s. The mine is estimated to account for roughly 585 persons of the population increase.

Demographically, racial minorities account for a smaller percentage of the population in Stillwater County than in Montana or the United States as a whole. In 1990 American Indian tribal members comprised but 0.8 percent of the population. Persons of Hispanic origin constituted the largest minority group at 1.4 percent of the 1990 Stillwater County population compared to 1.5 percent for the State and 9.0 percent for the United States as a whole (DSL, 1992, p. 94).

In terms of age, the population of Stillwater County is older than the statewide average. This could be reflective of the lack of job opportunities for younger residents or the attractiveness of the area to retirees. The median age in Stillwater County is 36.5 years compared to 33.8 years for the State. Persons 65 years of age and older account for 16.7 percent of the Stillwater County population while 13.3 percent of Montana residents are in that category. The proportion of females in the County population is slightly lower than that of the State (50.1 percent for Stillwater County versus 50.5 percent for Montana) (DSL, 1992, p. 95).

Park County, Wyoming

Cody, Wyoming is the community within this county most likely to be affected by decisions resulting from this analysis. Cody is the county seat and the retail and social center for the County. Park County is sparsely populated with 3.1 people per square mile, which is lower than the 4.7 people per square mile for State as a whole.

County-wide, racial minorities account for 6.0 percent of the population. Persons of Spanish-American descent constituted the largest minority group at 4.0 percent, followed by American Indians at 1.0 percent, with the remaining 1.0 percent comprised of Asian or Pacific Islanders and African-Americans. Compared to the State as a whole, Park County has a lower percentage of persons of African-American descent and persons from American Indian Tribes.

The median age of the population of Park County is 33.9 years compared to the statewide median age of 32.0 years. The percentages of females to males for Park County is 51.0 percent to 49.0 percent, respectively. By comparison, the statewide population is 54.0 percent female and 46.0 percent male.

3.1.7.3 ATTITUDES, BELIEFS, AND VALUES

Aside from some slight variation, the individuals and populations of the three counties share many common attitudes, beliefs, and values. Residents of Red Lodge and Cody have more in common with one another than with those living in the more undeveloped areas of their respective counties. Similarly, rural county residents, as a group, share many attitudes, beliefs and values.

The relationship between the oil and gas industry and the tourism-dependent industries is an important and delicate one for these counties. Some area residents recognize their historical dependence on oil, gas, or coal and view continued minerals development as an important source of economic stability. However, other residents see their future economic growth as being tied increasingly to recreation and tourism. One group supports relatively unconstrained development and appears willing to accept alteration of the physical environment. The other group advocates maximum preservation of the existing environment and are willing to forego the economic opportunities associated with resource development. This transitional "boom and bust" scenario means that additional hydrocarbon development proposals are viewed as attractive, but likely to receive public support only if the unique physical environment can be preserved. Examples of both attitudes are prevalent in the comments received during the scoping process for this project.

Part of the local population expresses preference for low-development, as well as for continued growth in the tourism/recreation industry. The assumptions behind this attitude are that tourists coming to the region are attracted by the natural environment. Thus, a growing tourism industry will make future economic expansion less likely to require extensive environmental modifications or major alterations of the small-town and rural lifestyles valued by many area residents.

"Regional" residents (Montana, Wyoming, and Idaho), including those who participated in the scoping efforts from Billings and Yellowstone County metropolitan area, and many people who commented from outside of Montana, Wyoming and Idaho were largely opposed to oil and gas or any other development that might degrade the "experience" of the Beartooths. Most of these people expressed concern for the scenic beauty, naturalness, and wilderness-like qualities and the quality of life in the Beartooths. They opposed development that would result in tradeoffs of these values for short-term benefits of oil and gas development and irreparable damage to and scarring of the landscape. Many felt that the Beartooths should be left free of development for the benefit of future generations to see as it is now. Those "regional" scoping participants who supported oil and gas development emphasized the possibilities of compatible coexistence of oil and gas with other resource uses, since there were sufficient regulations to ensure environmental protection of the area. All of this information is included in specialists' reports in the project file.

3.1.8 ECONOMICS (Issue # 8)

3.1.8.1 ECONOMIC STABILITY AND REVENUES

The analysis area for the economic impacts associated with the activities described in the Reasonably Foreseeable Development Scenario includes Carbon and Stillwater Counties, Montana, and Park County, Wyoming. The economic impacts of the exploration will likely extend beyond these counties, but it is necessary to place a limit on the geographic scope of the analysis. The determination to focus on these particular counties for the economic impact evaluation was based upon such considerations as which individuals, industries, and institutions will be most affected by the different alternatives, the likely locations of oil and gas-related activities, and household and industry trading patterns in the area.

The distribution of labor income and employment among major industries provides some insight into the structure of the area economy. Table 3.13 shows the labor income for the three counties in the analysis area. Because of the limited number of firms in the mining and manufacturing industries in Stillwater County, labor income for those individual categories is not disclosed by the Bureau of Economic Analysis. However, data published by the Montana Department of Labor (1990) suggests that mining accounts for over one-fourth of total labor income, while labor income from manufacturing is fairly close to the statewide average of 8.4 percent. Mining, which includes oil and gas and related activities, provides approximately 2.3, 26.7, and 7.8 percent of the jobs in Carbon, Stillwater, and Park Counties, respectively (Table 3.14).

Structure of the Local Economy

TABLE 3.13
1989 Labor Income by Major Industry

Industry	Income (thousands of 1990 dollars)			Percent of Total		
	Carbon County	Stillwater County	Park County	Carbon County	Stillwater County	Park County
Total labor income	45,335	54,631	242,188	100.0%	100.0%	100.0%
Agriculture	12,434	7,669	(544)	27.4	14.0	-0.2
Agricultural services, forestry, and fisheries	864	345	1,719	1.9	0.6	0.7
Mining	1,292	(D)	32,414	2.8	(D)	13.4
Construction	1,978	1,908	30,401	4.4	3.5	12.6
Manufacturing	768	(D)	9,710	1.7	(D)	4.0
Transportation and public utilities	3,396	2,311	15,609	7.5	4.2	6.4
Wholesale trade	776	1,240	9,489	1.7	2.3	3.9
Retail trade	5,163	4,437	24,478	11.4	8.1	10.1
Finance, insurance and real estate	784	291	6,360	1.7	0.5	2.6
Services	8,493	7,033	44,983	18.7	12.9	18.6
Government						
Federal, civilian	1,671	881	23,089	3.7	1.6	9.5
Federal, military	328	254	1,748	0.7	0.5	0.7
State and local	7,390	5,721	42,732	16.3	10.5	17.6

Totals may not add exactly due to rounding.
(D) Not shown to avoid disclosure of confidential data. Data included in totals.
Source: Bureau of Economic Analysis, April 1991.

TABLE 3.14
Average Annual Covered Employment - 1989

Sector	Carbon County	Stillwater County	Park County
Agricultural services, forestry and fisheries	25	37	209
Mining	36	436	749
Construction	43	41	710
Manufacturing	65	194	377
Transportation, Communications and Public Utilities	72	40	419
Wholesale trade	40	43	396
Retail trade	394	231	1,813
Finance, insurance and real estate	59	20	286
Services	369	256	1,840
Government			
Local	383	274	1,905
State	22	16	151
Federal	73	39	774
Unclassified	0	6	0
Total	1,582	1,633	9,631

Source: Division of Research and Planning, 1991, and Research and Analysis Bureau, 1990.
Note: Totals may not add due to rounding.

Agriculture

TABLE 3.15
Farm Statistics - 1982 and 1987

	Number of Farms		Average Size (acres)		Market Value of Agricultural Products Sold (average per farm)	
	1987	1982	1987	1982	1987	1982
Carbon County	635	597	845	1,053	57,793	53,913
Stillwater County	447	429	1,885	2,012	58,637	55,500
Park County	618	628	1,549	1,712	80,824	121,462

Source: Bureau of the Census, March, May and June 1989, and June and July 1984.

When compared to Montana overall, agriculture in Carbon and Stillwater Counties accounts for a larger percentage of labor income. For Park County, Wyoming, agriculture labor income (total farm labor income and proprietors' income) was negative in 1989 (that is, did not realize a profit, but a loss, Table 3.12), but the lack of profitability understates the importance of agriculture to the economy of the county. Statistics from the most recent Census of Agriculture are shown in Table 3.15.

The market value of agricultural products sold in 1987 totalled $36.7 million in Carbon County, $26.2 million in Stillwater County, and $49.9 million in Park County (Bureau of the Census). Compared to 1982, the 1987 values represented increases for Carbon and Stillwater Counties, but a sizable decrease for Park County. When adjusted for inflation, agriculture income in Carbon and Stillwater Counties was less than five years earlier.

Livestock, poultry, and their products account for the largest percentage of agricultural products sold in all three counties. Crop sales were less significant. Cattle and calves make up the largest component of livestock. Chickens, hogs, and sheep are also important. Wheat, hay, barley, and corn are the major crops.

Mining

Mining, which includes the oil and gas industry, is a significant source of labor income in Stillwater County, but is relatively less important from the standpoint of labor income than in the other two counties. Even so, $32.4 million in labor income was generated in the mining sector in Park County in 1989 (Bureau of Economic Analysis, 1991).

There is a long history of mining and oil and gas extraction in the three counties. Coal was discovered in Carbon County in the 1870's, and a number of mines were developed to supply fuel for locomotives (Carbon County News, 1991). Many of these closed during the Depression years, and coal mining in Carbon County ceased in the 1940's. Oil and gas is now the most important mineral extraction industry in the county.

Mining activity in that portion of the Stillwater Complex lying within Stillwater County dates back to the 1800's, when sulfide-rich rocks containing copper and nickel were discovered (Page et al., 1985). Chromite occurs in the Stillwater Complex, and the Benbow, Gish, and Mouat mines were developed in the early 1900's for the purpose of mining chromite. Chromite mining in the area ended in 1961. Increased interest in platinum-group metals in the Stillwater Complex in the 1960's and 1970's eventually led to the development of Stillwater Mining Company's platinum-palladium mine near the site of the Mouat operation.

Although certain other minerals, such as gypsum, are produced in Park County, oil and gas dominates the mineral extraction industries. There are a number of oil and gas fields at various locations in the county, and some of these, including Badger Basin, Big Polecat, Elk Basin, Frannie, Pitchfork, and Shoshone, have produced for decades.

Table 3.16 displays the 1990 oil and gas production for Park County, and for Carbon and Stillwater Counties in Montana. Approximately 7.5 million barrels of crude oil and 13.6 billion cubic feet of natural gas were produced in the three-county area with, by far, the largest share of the output coming from Wyoming.

TABLE 3.16
1990 Oil and Gas Production

County	Crude Oil Production (barrels)	Gas Production (thousand cubic feet)
Carbon County	730,361	1,508,790
Stillwater County	0	529,509
Park County	6,746,287	11,547,949
Total	7,476,648	13,586,248

Source: Montana DNRC, August 1991, and Wyoming OGCC, 1991.

Recreation and Tourism

A wide variety of recreational opportunities exist for all seasons in the Beartooth area. Many businesses in the three counties are directly or indirectly dependent upon recreation and tourism. Some of the major attractions in the area include Yellowstone National Park, the Absaroka-Beartooth Wilderness, the Buffalo Bill Historical Center, and the Beartooth Scenic Highway. It is difficult to quantify the economic impacts associated with these activities. There is no specific category for recreation or tourism in the Standard Industrial Classification (SIC) codes, so recreation-related expenditures are spread among such industries as retail trade, food services, lodging, and gasoline.

Recreation and tourism-related businesses in and around Red Lodge include motels, restaurants, gift shops, stores selling or renting recreational equipment, guest ranches, outfitters and guides, and a downhill ski area. There are also firms which manufacture recreational equipment sold in local and distant markets. In addition to the physical attractions of the area, a number of events, such as the Festival of Nations, the Red Lodge Mountain Man Rendezvous, and the Red Lodge Music Festival draw visitors to Red Lodge each year.

In 1990, the University of Montana's Institute for Tourism and Recreation Research (Yuan, et al., 1991) conducted a study of non-resident travel in Montana. This study indicates the magnitude of the economic effects of recreation and tourism in the area covered by this analysis. Carbon and Stillwater Counties are in Yellowstone Country (one of Montana's six tourism regions) which also includes all or parts of Gallatin, Park, and Sweet Grass Counties.

The surveys indicate that the average daily expenditures by nonresidents travelling in Montana ranged from $68.77 to $117.19, depending upon the season and the mode of travel (i.e., highway or air). For Yellowstone Country, nonresident expenditures were estimated to be $161 million or 21 percent of all nonresident tourism expenditures in Montana. The direct employee compensation associated with these expenditures amounted to approximately $40 million. Additional wages were generated by the secondary impacts of the expenditures.

A 1990 study by the Rocky Mountain Region of the Forest Service showed that tourism activities on the northern part of the Shoshone National Forest, which includes Park County, contribute almost $21 million income to the local economy. Recreation, wildlife, and fishing account $16.4 million, or 78 percent, of the total.

Recreation use on the Beartooth Ranger District was an estimated 500,000 recreation visitor days (RVDs) in 1991. Two of the major recreation categories (camping, picnicking, and swimming; mechanized travel and viewing scenery) account for about 50 percent of the RVDs. The remaining use was distributed among such activities as hunting, fishing, winter sports, hiking, horseback riding, and water travel. Using market-clearing prices as described in *Resource Pricing and Valuation Procedures for the Recommended 1990 RPA Program* (USDA-Forest Service, 1990), the value of 1991 recreation use on the District (excluding Wilderness) was about $19 million.

Other Industries

Most other industries in Carbon and Stillwater Counties make up a smaller percentage of total labor income than other areas of the State. Lower percentages for such industries as trade, services, finance, insurance, and real estate show that residents leave the counties to purchase many goods and services. For rural counties, this parallels the behavior observed at the statewide level. Park County, Wyoming, by virtue of its population, is an" intermediate trade center," and total labor income is closer to the statewide averages than is that of Carbon and Stillwater Counties.

Trends in Labor Income

In 1989, the agricultural industries, fishing, mining, construction, wholesale trade, services, government, transportation, communications, and public utility sectors accounted for a larger share of total labor income in the analysis area than in 1969. Agriculture, manufacturing, retail trade, finance, and insurance declined in relative importance. Looking at U.S. labor income, by sector, over the 20-year period, similar trends were recorded in some industries (agriculture, agricultural services, fishing, manufacturing, wholesale and retail trade, and services). Other sectors in the national economy, such as mining, construction, transportation, communications, public utilities, finance, insurance, real estate, and government differed from the analysis area pattern.

Mineral commodity production became more significant in the analysis area between 1969 and 1989. Stillwater Mining Company's platinum-palladium mine in Stillwater County went into production. Also, the area saw increased oil and gas activity in Park County in the late 1970's and early 1980's due to rising oil prices. In recent years, however, the moderation in oil prices has resulted in a reduction in activity and a drop in labor income from the oil and gas sector.

Construction-related labor income in Carbon, Stillwater, and Park Counties has been affected by persons immigrating from other states (e.g., California, Minnesota, Washington) who have built new homes either for year-round or seasonal occupancy. Factors which contribute to this immigration may include the natural amenities of the region, the relatively low cost of living, and technological advances which permit greater flexibility in where certain types of work can be performed.

Labor Force

The 1990 labor force statistics and unemployment rates for the analysis area are shown in Table 3.17. Beginning in 1987, the unemployment rate in Stillwater County decreased relative to Park and Carbon Counties with the hiring of more workers at the Stillwater mine. For 1990, unemployment rates for all counties in the analysis area were below the rates for the U.S., Montana, and Wyoming. In 1991 unemployment rose significantly in Stillwater County after about one-fourth of the mine workers were laid off in March.

TABLE 3.17
1990 Labor Force Statistics and Unemployment Rates: 1985-90

	Carbon County	Stillwater County	Park County	Total
Labor Force	3,856	3,347	13,842	21,045
Employed	3,691	3,229	13,185	20,105
Unemployed	165	118	657	940
Unemployment Rate	4.3%	3.5%	4.7%	4.5%

Source: Division of Research and Planning, 1991, and Research and Analysis Bureau, 1991.

For Carbon County, although actual numbers of jobs increased in the early 1980's, the numbers of persons unemployed increased at a greater rate. This trend was reversed beginning about 1987 as both numbers of jobs and numbers of persons unemployed fell, with a greater relative decrease recorded for unemployment.

Both Park County and the State of Wyoming experienced a substantial increase in unemployment in 1986 due to the precipitous decline in oil prices that year, and the subsequent slowdown in oil and gas activities. The unemployment rate in Park County generally has trended downward since then. The decrease has been attributed to emigration by the unemployed rather than an expansion in employment opportunities in the county.

Personal Income

Personal income is the income received by persons from all sources including wages and salaries, proprietors' income, transfer payments, dividends, interest and rents. Expressed in constant 1990 dollars, personal income totalled $111.9 million in Carbon County in 1989, $107.6 million in Stillwater County, and $377.6 million in Park County. Table 3.18 lists the major components of personal income for the counties in the analysis area.

TABLE 3.18
1989 Personal Income by Major Component

	THOUSANDS OF 1990 DOLLARS			PERCENT OF TOTAL		
	Carbon County	Stillwater County	Park County	Carbon County	Stillwater County	Park County
Total Personal Income	111,859	107,563	377,554	100.0%	100.0%	100.0%
Social Security contribution	(3,092)	(3,963)	(15,360)	-2.8	-3.7	-4.1
Residence adjustment	11,854	13,531	(1,819)	10.6	12.6	-0.5
Dividends, interest and rent	32,985	24,933	95,383	29.5	23.2	25.3
Transfer payments	24,777	18,430	57,161	22.2	17.1	15.1
Labor income	45,335	54,631	242,188	40.5	50.8	64.1

Source: Bureau of Economic Analysis, April 1991.

The residence adjustment figures on Table 3.18 indicate a significant number of Carbon and Stillwater County residents commute to other areas for work. The figures for Park County, Wyoming is small, implying little commuting into or out of the county for work.

Transfer payments and dividends, interest, and rents account for a larger percentage of personal income in Carbon County than in Stillwater or Park Counties. This trend may be due to a greater percentage of the population being retired in Carbon County, as indicated by a higher median age in Carbon County and the proportion of transfer payments that is made up of retirement benefits.

Labor income's share of total personal income is highest in Park County. This does not take into account the residence adjustment for Carbon and Stillwater Counties which may be derived, in large part, from labor income earned in other counties. Even considering the residence adjustment, however, labor income appears to play a less significant role in Carbon County.

Income generated by Stillwater Mining Company's operation has resulted in a narrowing of the gap between the U.S. per capita income and that of Stillwater County. Although nominal per capita income in Park County was higher in 1989 than in 1980, a substantial drop in farm income and decreases in other categories, such as manufacturing, prevented per capita income from keeping pace with inflation.

HOUSING

The number of housing units rose by 10.7 percent in Carbon County and 22.8 percent in Stillwater County, as compared to the State average of 10.0 percent. Housing construction in the Red Lodge, Absarokee, Columbus, and Park City areas showed the most activity, while increase of housing numbers in other areas was more modest, or, in the case of the Fromberg-Bridger area, total number of units actually declined. For Park County, Wyoming, the number of housing units increased more than twice the statewide percentage rise (8.1 percent).

TABLE 3.19
Vacancy Rates - April 1, 1990 (in percent)

	Homeowner Vacancy Rate	Rental Vacancy Rate
Carbon County	4.1	13.7
Stillwater County	2.6	9.5
Park County	3.2	11.2
Montana	2.9	9.6
Wyoming	3.9	14.4

Source: Bureau of the Census, 1991.

In spite of the additions to the housing supply, housing availability in all three counties is generally viewed as limited, particularly for rentals. The homeowner and rental vacancy rates as of April 1, 1990 are shown in Table 3.19. None of these vacancy rates are indicative of a limited supply, but they do not take into account the suitability of the units. Also, the location of the vacant units within the counties may not match the current geographic distribution of demand, again leading to vacancy rates which are higher than people's perception of the state of the real estate market.

The shortage of rental housing seems particularly acute in Stillwater County. Mine employment has increased competition for rentals, and rents have increased significantly in that area. Census data indicates that contract rents in Stillwater County rose an average of 5.9 percent per year from 1980 to 1990 compared to 4.3 percent for the State.

Census data show that the median value of owner-occupied homes in the three counties have not appreciated to the degree that rents have. From 1980 to 1990, values increased an average of 2.2 percent per year in Carbon County, 2.7 percent in Stillwater County, and 2.0 percent in Park County. It appears that, in contrast to rental units, the supply of owner-occupied units has increased more in line with demand, resulting in relatively stable housing prices. In addition, the demand for houses to buy in some areas, such as Stillwater County, is constrained by the limited financial resources of those moving into the community.

3.1.8.2 FISCAL CONDITIONS

Property Tax Base: In 1991, the taxable value of real and personal property was $17.0 million in Carbon County, $19.5 million in Stillwater County, and $391.3 million in Park County. The taxable value is based upon a statutory percentage of the market value, and this percentage varies by state, as well as by type of property. Expressed in constant dollar terms, the 1991 taxable value for Stillwater County was 2.2 percent higher than in 1985. The 1991 figures for Carbon and Park Counties, however, represented decreases in taxable value of 54.2 percent and 46.4 percent, respectively, over this same period.

The increase of property taxable value in Stillwater County is largely attributable to the development of Stillwater Mining Company's platinum-palladium mine. About three-fourths of the taxable value in Park County is from oil and gas production. Decreasing oil and gas prices and lower output from some of the major oil fields have been significant factors in the downward trend in taxable value in Stillwater County. Lower oil prices had a similar effect on the taxable value of property in Carbon County. In addition, the value of oil and gas production was removed from the local property tax base in 1990 as a result of new legislation. Montana counties now receive revenue from oil and gas production through the Local Government Severance Tax (LGST) which is collected by the State and then passed on to the counties.

Information from county assessors indicate that countywide levies for the current fiscal year are 215.59 mills in Carbon County, 201.85 mills in Stillwater County, and 60.28 mills in Park County. In Park County, the substantial property tax revenue generated by oil and gas production appears to have been a major factor in keeping total mill levies at relatively low levels. Current levies in Carbon and Stillwater Counties are much higher than a few years ago. This is due to a new levy of 40 mills resulting from 1989 State legislation to equalize school funding. The levy is applicable to every county in the state.

County Receipts: Under a 1908 Forest Service law, 25 percent of the revenue received by a National Forest is distributed to the counties where the National Forest is located to be used for roads and public schools. Other sources of revenue included timber, minerals, and recreation-user fees. The amounts returned to Carbon and Stillwater counties are shown in Table 3.20. The table also includes Park County's share of the Shoshone National Forest's receipts.

TABLE 3.20

Fiscal Year 1991 Payments to Counties From National Forest Receipts

County	Payments
Carbon County	$ 26,116
Stillwater County	17,066
Park County	141,444
Total	$184,626

Source: USDA Forest Service Northern Region, 1991, and Rocky Mountain Region, 1991.

In addition to these revenues, payments from oil and gas production from Federal mineral estates are made to the U.S. Treasury under the Mineral Leasing Act of 1920 and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. Fifty percent of the revenue collected by the U.S. Treasury is sent back to the states. In Montana, the entire amount goes to the Office of Public Instruction (OPI). OPI then distributes the funds according to school equalization formulae. The distribution is based upon the needs of school districts throughout the state. Thus, the location where the revenue was generated has no bearing on the allocation.

On the Beartooth Ranger District, approximately 46,000 acres are currently leased for oil and gas, so the U.S. Treasury receives about $46,000 per year from lease rental fees, based on $1.00 per acre fee. The minimum lease rental for leases issued after December 22, 1987 is $1.50 per acre, but all of the leases on the Beartooth Ranger District were issued prior to that date. Of the $46,000, 50 percent is returned to Montana to be distributed to school districts by OPI.

Some of the Shoshone National Forest lies in Park County, Wyoming, and 124,019 of that Forest's acres in the county are leased for oil and gas. Thus, lease rentals to the U.S. Treasury for the Park County acreage total $124,019 per year, and $62,009 of that amount is sent back to the State of Wyoming.

There is no oil and gas production from the leases on the Beartooth Ranger District or on the Park County portion of the Shoshone National Forest.

3.1.8.3 COMMUNITY SERVICES AND FACILITIES:

Carbon County

Carbon County offers a full spectrum of community services, particularly at Red Lodge, the county seat. County services found at Red Lodge include, but are not limited to, the county courthouse, sheriff's department, the office of the county superintendent of schools, the county health service, and the county extension agent. The town also contains a hospital with 22 licensed beds, two long term care facilities with 110 licensed beds and two medical clinics. Currently, seven physicians, three dentists, and five nurses serve the Red Lodge community.

The school system at Red Lodge, which is county based, has an enrollment of 535 students distributed at one kindergarten, one elementary, one middle school , and one high school. Combined, these schools employ 38 teachers and have a teacher/student ratio of 1/14.08. The current enrollment at Red Lodge appears to be about 10.0 percent below capacity. The Red Lodge schools have capacity to accept several more students at each grade level without encountering problems with funding or physical facilities. Additional capacity also exists at several schools in the less populated areas of Carbon County.

Some of the facilities in Carbon County are considered adequate (such as the airport and hospital). Other facilities and certain services are below desired levels. Adequacy of road maintenance and law enforcement are important issues in the county. Within the town of Red Lode, although the community water treatment plant and sewage lagoons are now adequate, some of the water and sewer lines need to be replaced. Lack of funds to do this constrains further development within the town. The city police and fire departments are operating on reduced budgets, resulting in unmet personnel, equipment, and training needs.

Stillwater County

Columbus is the county seat of Stillwater County. Columbus has the county's one hospital, with 27 beds; and one long-term care facility with 81 beds. The Stillwater County school system has an enrollment of 1,388 students. In terms of those schools nearest to the analysis area, elementary student enrollments total 259 at Absarokee, 392 at Columbus, 40 at Fishtail and four at Nye; while high school enrollments are 132 at Absarokee and 130 at Columbus. The Absarokee schools have a limited capability to absorb future increases in enrollment, particularly at the elementary level, but the Fishtail and Nye elementary schools could accommodate more students. The Columbus school system is at capacity at the elementary level, both in terms of class size and physical facilities. The junior and senior high schools are not as crowded, so increases in enrollment would not pose as big a problem as at the elementary level.

The Stillwater Mining Company has provided financial assistance to enable communities in Stillwater County to better accommodate the growth that has occurred. However, there are still concerns over the ability to meet the needs for services. The sewer system for the town of Columbus is at capacity, and water lines in Columbus are in need of upgrading. The additional traffic from the population growth has resulted in unmet street maintenance needs, including paving some of the gravel streets. With the hiring of additional law enforcement personnel, office space is inadequate.

Park County, Wyoming

Cody, Wyoming is the county seat for Park County, so possesses the normal county government services, i.e. courthouse, sheriff's department, extension agent, etc. As a full service community it also has one hospital with 46 beds, one long-term care facility with 105 beds, 24 doctors and nine dentists. The county has an approximate enrollment of 2,600 students in five elementary schools, one junior high school, and one high school.

The larger property tax base in Park County seems to have enabled it to avoid many of the budget-related problems experienced in Carbon and Stillwater Counties. The towns in Park County are served by a municipal water system, the source of which is the Buffalo Bill Reservoir. The system will eventually be expanded to rural areas of the county. No major deficiencies are evident in other Park County services or facilities. In general, the county appears to be in a position to handle further population growth. However, there is a concern that as oil fields in the area become depleted, tax revenues will decline, making it more difficult to finance operating budgets or capital improvements.

Cody schools are considered overcrowded, but a $13.25 million bond issue recently passed to finance construction of new elementary and middle school facilities.

3.2 EXISTING CONDITIONS BY MANAGEMENT AREA

Because the leasing decision (what lands to offer for lease and what stipulations apply for each area) will be made by management area, the following discussion of the affected environment highlights key resources and issues for each of the 31 areas. Management area goals and standards not relevant to this decision are not discussed. For acreage information for resources or conditions for the total area, or for a specific resource refer to the table located in section 3.1.

A table providing information by management area is included at the start of each management area discussion. The acreages displayed in the following tables show resource areas that may overlap (i.e. portions of the high hazard and fragile soils may overlap some of the same area within slopes that are greater than 40%), and as a result are **not** additive. Also, the percentage acreage figures given refer to specific management areas, not to the entire group within a management area designation.

3.2.1 MANAGEMENT AREA B

The goal for Management Area B; as stated on page 45-47 of the Forest Plan is "to provide for continuation of livestock grazing, implementation of intensive range management systems, and the facilitation of minerals and energy development with consideration of other resource needs. In areas not considered key for wildlife, adverse impacts to the wildlife habitat will be mitigated where feasible, but not to the exclusion of range and mineral/energy management and development activities. In key wildlife areas, the habitat may not be adversely impacted from development activities."

The visual quality objective for Management Area B may range from retention to modification.

Table 3.21
Management Area B Resource/Issue Information

RESOURCE	Bad Canyon	Little Rocky	Black Butte	Butcher Creek
Management Area Acres	17,260	3,100	2,620	930
SOILS and VEGETATION (acres)				
High Hazard and Fragile Soils	8,700	720	1,420	30
Sensitive Plant Habitat				
Shoshonea pulvinata	290			30
Gentianopsis simplex			60	
Riparian Areas - MA M	890	170	170	20
FISH and WILDLIFE				
Sensitive Species				
Yellowstone Cutthroat Trout Habitat (miles)				
Verified genetically pure	4			
Presumed genetically pure		1		
Threatened and Endangered Species				
Gray Wolf Potential Habitat		3,460		
Bald Eagle Habitat (acres)			90	
Peregrine Falcon Habitat (acres)	8,640		1,510	1,340
Raptors				
Golden Eagle (nests)		1		
Golden Eagle Habitat (acres)	15,840	3,240	1,510	1,340
Prairie Falcon Habitat (acres)	15,840		1,510	1,340

RESOURCE	Bad Canyon	Little Rocky	Black Butte	Butcher Creek
Elk Home Ranges (acres)				
Black Butte Summer/Fall Range		20		
Black Butte Winter/Spring Range			180	
Meyers Creek Winter/Spring Range	70			
Trout Creek Summer/Fall Range	140			
Trout Creek Winter/Spring Range	140			
Luther Summer/Fall Range				20
Moose Home Range (acres)				
McDonald Basin Winter/Summer Range		1,720	80	
East Rosebud Winter Range			310	
Red Lodge Creek Winter Range				410
Mountain Goat Home Range (acres)				
East Rosebud Winter			30	
Mule Deer Winter Range (acres)				
Sheep Creek Winter Range	1,870			
Other Free Ranging Carnivore				
Lynx (Denning/Foraging)	0/220	0/350	0/1,230	0/340
Marten	220	320	1,230	340
Wolverine (Summer/Winter)	0/130	0/370	0/810	0/140
AESTHETICS				
Visuals; Slopes >40% (acres)	8,050	880	630	
RECREATION AND ACCESS				
Miles of Road				
Primitive	0.61	2.65		3.96
Aggregate		4.64		
RIM Trails and Trailheads	14.74			0.10
ROADLESS AREAS (acres)				
# 01368 Black Butte			810	
# 01371 North Absaroka	4,040			
CULTURAL SITES (number)	1	2		
OIL and GAS RELATED (acres)				
Oil and Gas Development Potential				
Moderate				850
Low	17,260	3,100	2,620	180

3.2.1.1 MANAGEMENT AREA B: BAD CANYON (17,260 Acres)(Map 3.4)

Soils: Fragile soils occur on about 50 percent (8,700 acres) of this area. Most of the soils are considered fragile due to high to very high water erosion and offsite sedimentation potential, as well as to low revegetation potential.

Vegetation: Vegetation communities are predominately Douglas-fir, limber pine, and grasslands. About five percent, or 890 acres, of the unit is riparian habitat. There are isolated locations of spotted knapweed and Leafy spurge exists in the area. About 290 acres (two percent) is suitable habitat for *Shoshonea pulvinata* in the Limestone Butte area. There is low potential for oil and gas occurrence and development in this habitat.

Fisheries: Species include Yellowstone cutthroat trout. Numerous lake and stream environments occur with this management area. Specific acreages and/or mileages have not been tabulated. This area contains the only verified genetically pure population of Yellowstone cutthroat trout.

Elk: This area provides habitat for two different elk herds. They are the Trout Creek and Meyers Creek herds. The Trout Creek herd represents a pioneering fraction of the Meyer's Creek herd. This area provides 140 acres (one percent of the management area) of winter/spring range, and and 140 acres (one percent) of summer/fall core home ranges for the Trout Creek herd. Most core home ranges however, are found on adjacent private land east of the decision area. The area provides 70 acres (less than one percent) of core winter/spring range for the Meyers Creek herd.

Mule Deer: The southern most portion of this area provides mule deer winter range. The Sheep Creek mule deer winter range encompasses about 1,870 acres. The majority of mule deer winter range is located on adjacent private land.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: One historic site is located in this management area. Based on the model, 23 acres are likely to have a high site density.

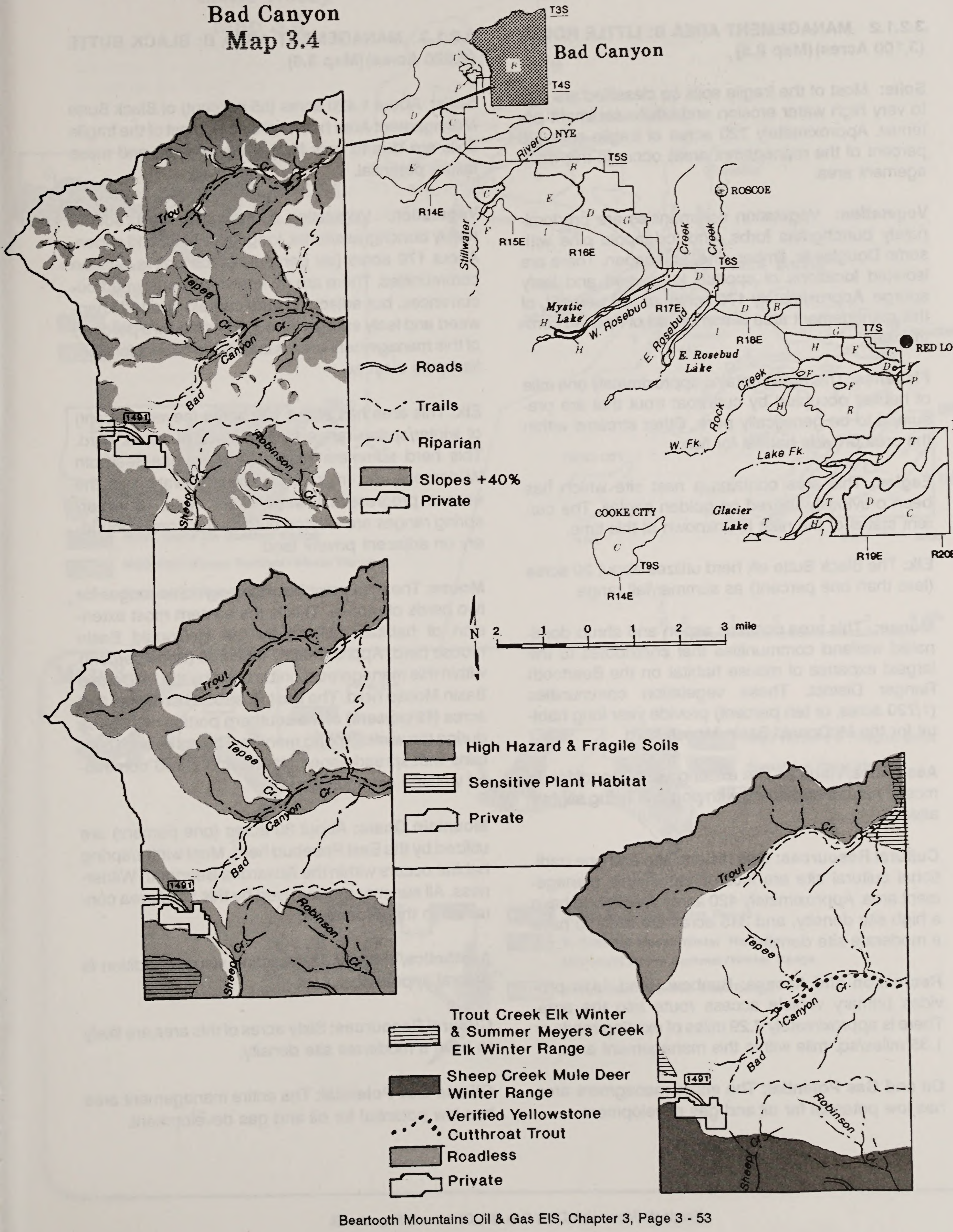
Recreation and Access: The only vehicle access into this area is through a private road. Trout Creek Trail 29 provides hiking or horseback riding opportunities into the area.

Roadless: There are 4,040 acres of the Black Butte Roadless Area within this management area.

Oil and Gas Potential: The entire management area has low potential for oil and gas development.

MANAGEMENT AREA B

Bad Canyon
Map 3.4



3.2.1.2 MANAGEMENT AREA B: LITTLE ROCKY (3,100 Acres)(Map 3.5)

Soils: Most of the fragile soils so classified are due to very high water erosion and offsite sediment potential. Approximately 720 acres of fragile soils (25 percent of the managemnt area) occur in this management area.

Vegetation: Vegetation communities are predominately bunchgrass forbs, and lodgepole pine with some Douglas-fir, limber pine, and aspen. There are isolated locations of spotted knapweed and leafy spurge. Approximately 170 acres, or five percent, of this management area is comprised of riparian communities.

Fisheries: This area contains approximately one mile of habitat occupied by cutthroat trout that are presumed to be genetically pure. Other streams within the area provide habitat for fish.

Eagles: This area contains a nest site which has been previously utilized by golden eagles. The current status of the nest is unknown at this time.

Elk: The Black Butte elk herd utilizes about 20 acres (less than one percent) as summer/fall range.

Moose: This area contains aspen and shrub dominated wetland communities that contributes to the largest expanse of moose habitat on the Beartooth Ranger District. These vegetation communities (1,720 acres, or ten percent) provide year long habitat for the McDonald Basin Moose herd.

Aesthetics/Visuals: The existing visual condition is mostly natural appearing with portions being slightly altered.

Cultural Resources: One historic site and one traditional cultural site are located within this management area. Approximately 420 acres are likely to have a high site density, and 345 acres are likely to have a moderate site density.

Recreation and Access: Benbow Road 1414 provides primary vehicle access route into the area. There is approximately 7.29 miles of existing roads or 1.35 miles/sq. mile within this management area.

Oil and Gas Potential: The entire managment area has low potential for oil and gas development.

3.2.1.3 MANAGEMENT AREA B: BLACK BUTTE (2,620 Acres)(Map 3.6)

Soils: About 1,420 acres (55 percent) of Black Butte Management Area has fragile soils. Most of the fragile soils are due to very high water erosion and mass failure potential.

Vegetation: Vegetation communities are predominately bunchgrass/forbs, lodgepole pine, and aspen. About 170 acres (six percent) of the unit is riparian communities. There are no known noxious weed occurrences, but adjacent lands contain spotted knapweed and leafy spurge. About 60 acres (two percent) of this management area has suitable habitat for *Gentianopsis simplex.*

Elk: This area has about 180 acres (seven percent) of winter/spring range for the Black Butte elk herd. This herd summers within the Absaroka-Bearooth Wilderness and migrates to lower elevation as the season progresses toward winter. Most of winter/spring ranges are located outside the Forest boundary on adjacent private land.

Moose: The area provides year long home ranges for two herds of moose. This is the eastern most extension of habitats utilized by the McDonald Basin moose herd. Approximately 80 acres (three percent) within this management unit is used by the McDonald Basin Moose herd. The East Rosebud herd uses 310 acres (12 percent) of the southern portion of the area during the winter/spring months. The entire area contains widespread aspen stands and shrub dominated wetland communities.

Mountain Goats: About 30 acres (one percent) are utilized by the East Rosebud herd. Most winter/spring habitat occurs within the Absaroka-Beartooth Wilderness. All summer ranges used by this herd area contained in the wilderness.

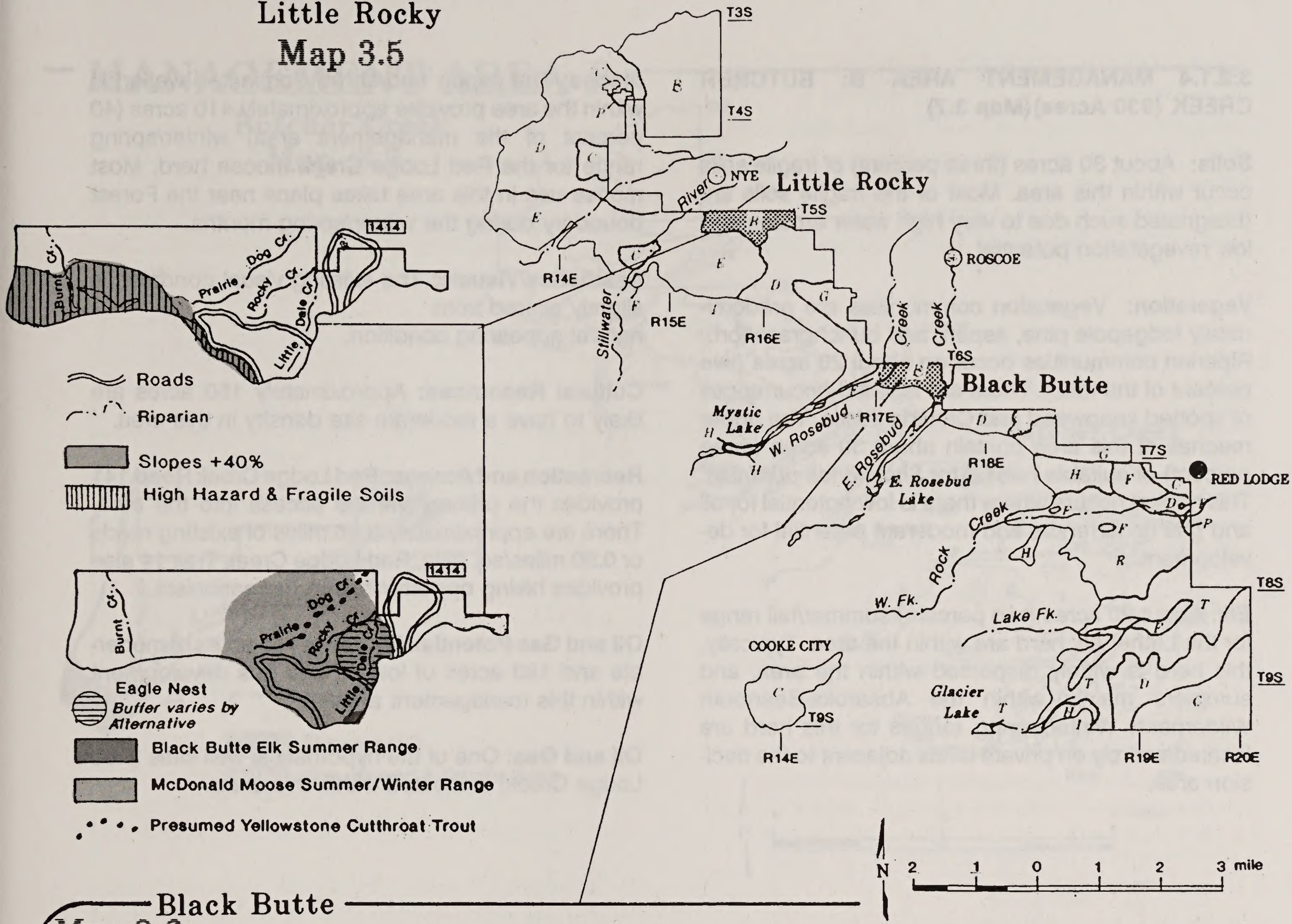
Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: Sixty acres of this area are likely to have a moderate site density.

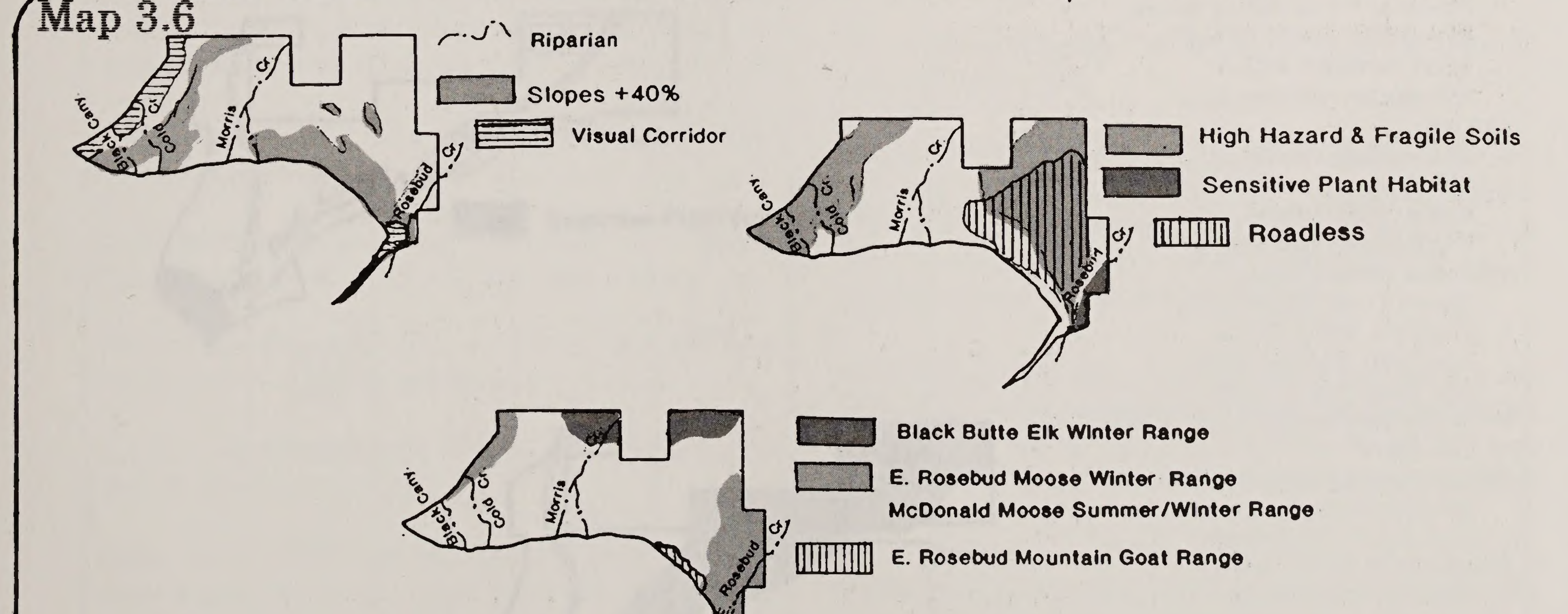
Oil and Gas Potential: The entire management area has low potential for oil and gas development.

— MANAGEMENT AREA B

Little Rocky
Map 3.5



Black Butte
Map 3.6



Black Cany.
Cold Cr.
Morris
Cr.
Rosebud Cr.
E. Rosebud
Riparian
Slopes +40%
Visual Corridor
High Hazard & Fragile Soils
Sensitive Plant Habitat
Roadless
Black Butte Elk Winter Range
E. Rosebud Moose Winter Range
McDonald Moose Summer/Winter Range
E. Rosebud Mountain Goat Range

3.2.1.4 MANAGEMENT AREA B: BUTCHER CREEK (930 Acres)(Map 3.7)

Soils: About 30 acres (three percent) of fragile soils occur within this area. Most of the fragile soils are designated such due to very high water erosion and low revegetation potential.

Vegetation: Vegetation communities are predominately lodgepole pine, aspen, and bunchgrass/forb. Riparian communities occur on about 20 acres (two percent of the total). There are isolated occurrences of spotted knapweed and Canada thistle. The upper reaches of this area contain about 30 acres (three percent) of suitable habitat for *Shoshonea pulvinata*. This habitat occurs where there is low potential for oil and gas occurrence, and moderate potential for development.

Elk: About 20 acres (two percent) summer/fall range for the Luther elk herd are within the area. Typically, this herd is widely dispersed within the area, and summers mainly within the Absaroka-Beartooth Wilderness. Winter/spring ranges for this herd are located entirely on private lands adjacent to the decision area.

Moose: The aspen and shrub dominated wetlands within the area provides approximately 410 acres (40 percent of the management area) winter/spring range for the Red Lodge Creek moose herd. Most moose use in this area takes place near the Forest boundary during the winter/spring months.

Aesthetics/Visuals: The existing visual condition is slightly altered from natural-appearing condition.

Cultural Resources: Approximately 150 acres are likely to have a moderate site density in this area.

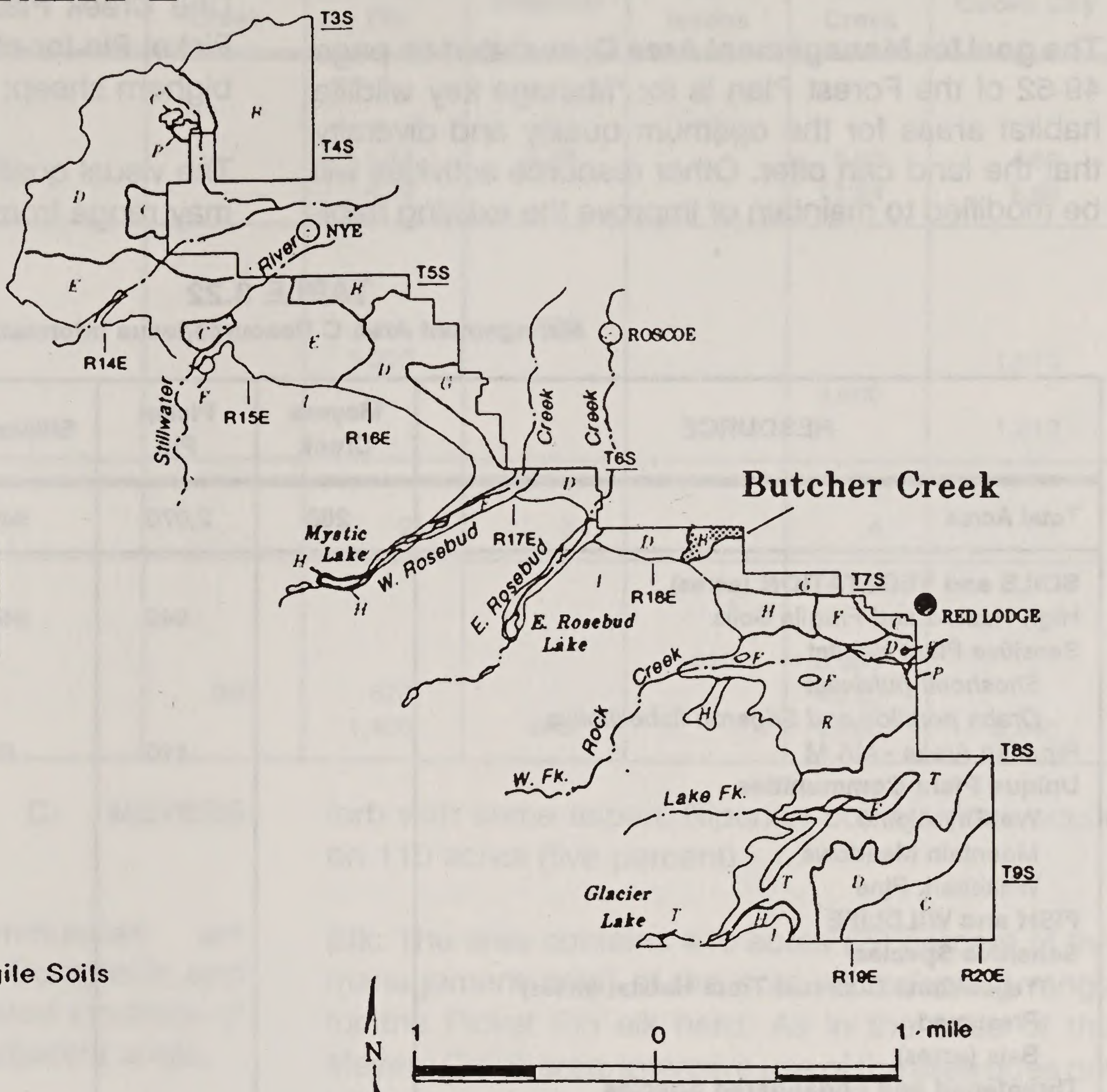
Recreation and Access: Red Lodge Creek Road 141 provides the primary vehicle access into the area. There are approximately 3.96 miles of existing roads or 0.90 miles/sq. mile. Red Lodge Creek Trail 14 also provides hiking opportunities to recreationists.

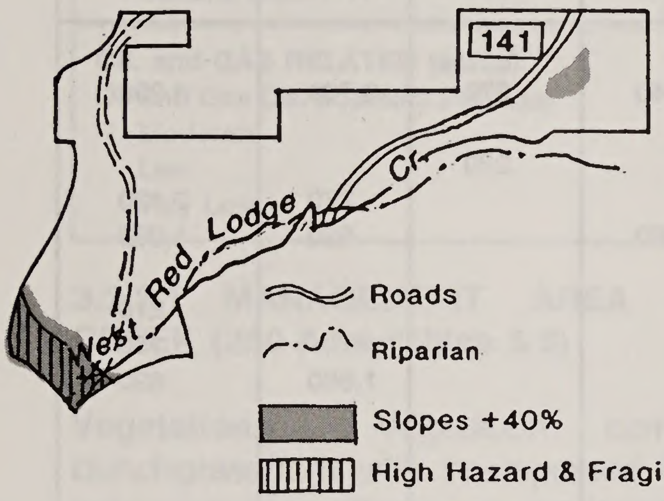
Oil and Gas Potential: There are 750 acres of moderate and 180 acres of low oil and gas development within this management area.

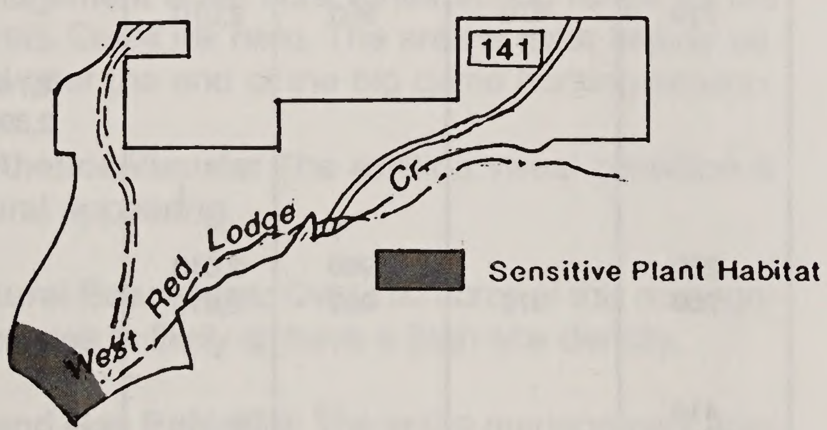
Oil and Gas: One of the hypothetical well sites (Red Lodge Creek) is located within this area.

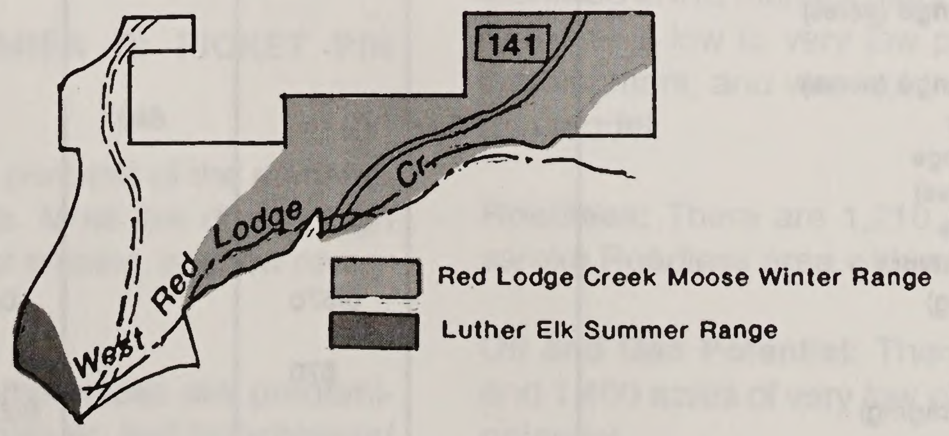
MANAGEMENT AREA B

Butcher Creek
Map ,3.7









3.2.2 MANAGEMENT AREA C

The goal for Management Area C; as stated on page 49-52 of the Forest Plan is to: "Manage key wildlife habitat areas for the optimum quality and diversity that the land can offer. Other resource activities will be modified to maintain or improve the existing habitat. Key areas for the Beartooth District include the Line Creek Plateau, Meyers Creek, Swamp Creek/Picket Pin for elk; Palisades for moose; Stillwater for bighorn sheep; and Slough Creek for grizzly bear."

The visual quality objective for Management Area C may range from retention to modification.

TABLE 3.22
Management Area C Resource/Issue Information

RESOURCE	Meyers Creek	Picket Pin	Stillwater	Pal-isades	Line Creek	Cooke City
Total Acres	280	2,070	940	810	10,490	5,890
SOILS and VEGETATION (acres)						
High Hazard and Fragile Soils		940	940	270	3,760	4,290
Sensitive Plant Habitat						
Shoshoea pulvinata				220		
Draba porsildii and Erigeron flabellifolius					270	2,120
Riparian Areas - MA M		110	80		520	1,030
Unique Plant Communities						
Wet/Dry Alpine						210
Mountain Meadows						150
Whitebark Pine					1,560	620
FISH and WILDLIFE						
Sensitive Species						
Yellowstone Cutthroat Trout Habitat (miles)						
Presumed						3.6
Bats (acres)				900	330	
Threatened and Endangered Species						
Gray Wolf(acres potential hab)	270	2,050	1,140		4,880	
Bald Eagle Habitat (acres)			220			
Peregrine Falcon Habitat (acres)		310	370	990	2,010	
Grizzly Bear Habitat (acres)						
Management Situation 1						2,740
Management Situation 2						2,890
Raptors						
Golden Eagle (nests)					1	
Prairie Falcon (nests)				1		
Golden Eagle Habitat (acres)	270	250		990	2,010	
Prairie Falcon Habitat (acres)	270	250	370	990	2,010	
Elk Home Ranges (acres)						
Meyers Creek Winter Range	190					
Picket Pin Winter Range		410				
Line Creek summer Range					4,540	
Line Creek Winter Range					5,340	
Mountain Goat Home Range (acres)						
Line Creek					3,620	
Bighorn Sheep Home Range (acres)						
Stillwater Winter Range			640			
Rock Creek Winter Range					1,030	
Moose Home Range (acres)						
Palisades Winter Range				340		
Other Free Ranging Carnivore						
Lynx (Denning/Foraging)		0/570		0/180	640/1,130	1,020/ 490
Marten		570		180	3,420	1,020
Wolverine (Denning/Foraging)				0/2,520	2,190/100	4,730/0
AESTHETICS (acres)						
Visuals: Slopes >40 percent				390	6,540	

RESOURCE	Meyers Creek	Picket Pin	Stillwater	Pal-isades	Line Creek	Cooke City
RECREATION AND ACCESS						
Miles of Road						
Primitive		1.61	0.63		5.60	4.69
Trails (miles)		4.03			11.24	8.88
ROADLESS						
Roadless Areas (acres)						
# 01369 West of Woodbine			720			
# 01371 North Absaroka		1,210				1,070
# 01911 Line Creek Plateau					4,880	
# 01912 Beartooth						1,210
CULTURAL						
Cultural Sites		2	3		4	7
OIL and GAS RELATED (acres)						
Oil and Gas Development Potential						
Moderate				810	3,980	
Low	280	670			4,730	
Very Low		1,400	940		1,780	5,890

3.2.2.1 MANAGEMENT AREA C: MEYERS CREEK (280 Acres)(Map 3.8)

Vegetation: Vegetation communities are bunchgrass/forb with interspersed Douglas-fir and lodgepole pine. There may be isolated locations of spotted knapweed as it occurs in adjacent areas.

Elk: This area contains 190 acres (70 percent of the management area) core winter/spring range for the Meyers Creek elk herd. The area is most heavily utilized after the end of the big game hunting season.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: Over 100 acres of this management area is likely to have a high site density.

Oil and Gas Potential: The entire management area has low oil and gas development potential.

3.2.2.2 MANAGEMENT AREA C: PICKET PIN (2,070 Acres)(Map 3.9)

Soils: About 940 acres (45 percent) of the management areas has fragile soils. Most are due to high wind erosion, very high water erosion, and low revegetation potential.

Vegetation: Vegetation communities are predominately lodgepole pine, Douglas-fir, and bunchgrass/forb with some aspen. Riparian communities occur on 110 acres (five percent).

Elk: The area contains 410 acres (20 percent of the management area) of the core winter/spring range for the Picket Pin elk herd. As in the case of the Meyers Creek area, intensive use of the area does not take place until the end of the big game hunting season.

Aesthetics/Visuals: The existing visual condition is natural appearing.

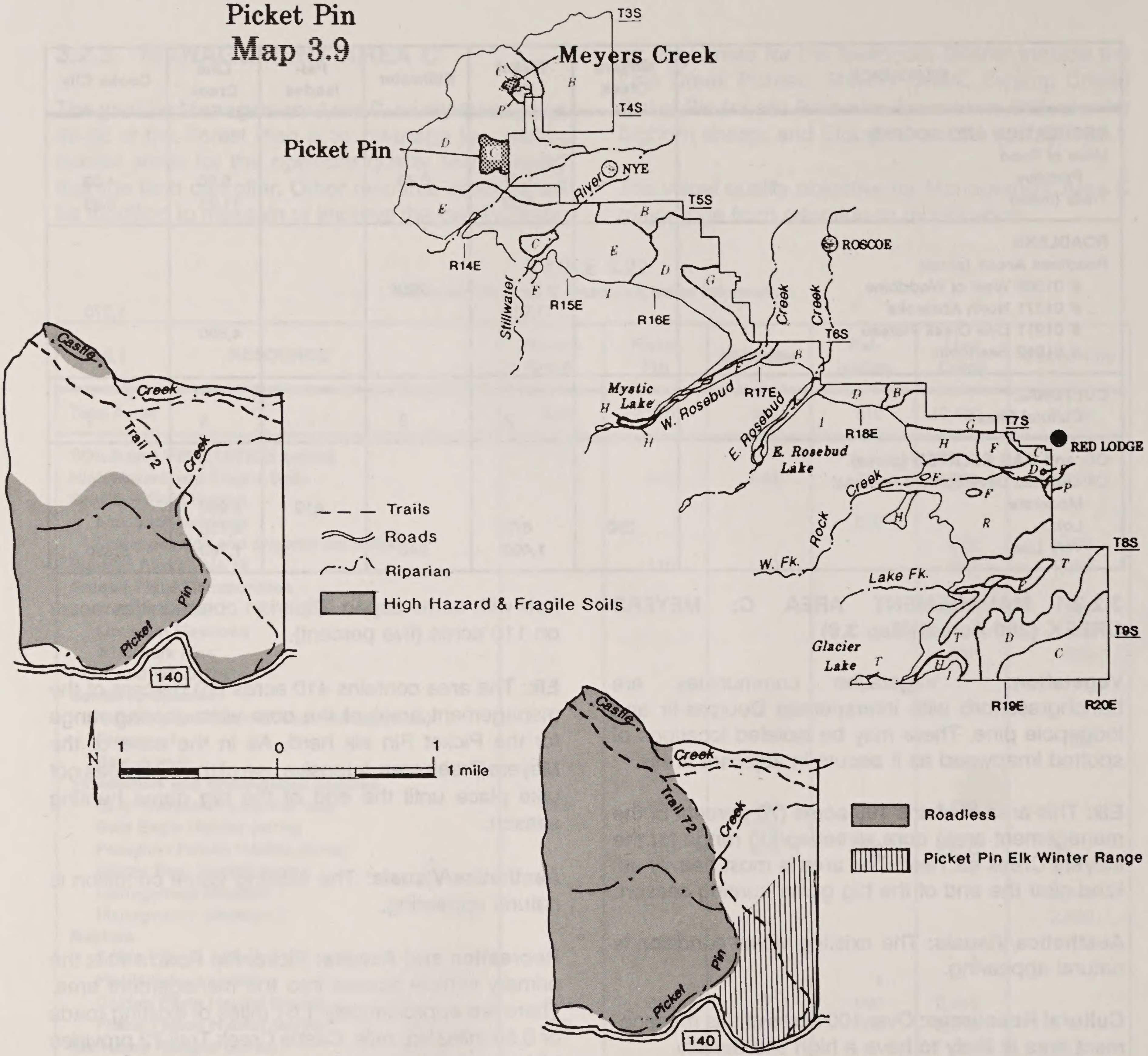
Recreation and Access: Picket Pin Road 140 is the primary vehicle access into the management area. There are approximately 1.61 miles of existing roads or 0.50 miles/sq. mile. Castle Creek Trail 72 provides hiking opportunities into the area.

Cultural Resources: Two cultural sites have been identified in this management area. The management area has a low to very low potential for oil and gas development, and was not included in the site location model.

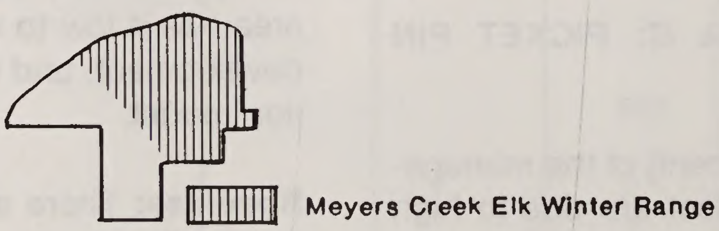
Roadless: There are 1,210 acres of the North Absaroka Roadless area within this management area.

Oil and Gas Potential: There are 670 acres of low and 1,400 acres of very low oil and gas development potential.

Picket Pin
Map 3.9



Meyers Creek
Map 3.8



3.2.2.3 MANAGEMENT AREA C: STILLWATER (940 Acres)(Map 3.10)

Soils: There are approximately 940 acres (100 percent of the management area) of fragile soils in this area. Most of these are are classified as such because of the high potential for water erosion and low potential for revegetation.

Air Quality: The Stillwater Mining Company (1990) monitored particulates, lead, and sulfates at their proposed smelter site near Nye. Air quality is in compliance with National Ambient Air Quality Standards (NAAQS).

Vegetation: Vegetative types are predominately Douglas fir and bunchgrass/forb. Eight percent of the management area (about 80 acres) are riparian areas. There are isolated occurrences of spotted knapweed.

Bighorn Sheep: This area provides approximately 640 acres (60 percent of the management area) of home range used by the Stillwater bighorn sheep herd during the winter/spring months. Typically, occupation of this area begins in late November or early December and continues until the last of April to the middle of May.

Aesthetics/Visuals: The Existing Visual Condition is approximately 50 percent natural appearing and 50 percent heavily altered.

Cultural Resources: Two prehistoric sites have been recorded in this area. The management area has very low potential for oil and gas development and was not included in the site location model.

Recreation and Access: Nickel Camp Road 846H provides access to Mouat Mine.

Roadless: There are 720 acres of the West of Woodbine Roadless Area within this management area.

Oil and Gas Potential: The entire management area has very low oil and gas development potential.

3.2.2.4 MANAGEMENT AREA C: PALISADES (1,370 Acres)(Map 3.11)

Soils: About 270 acres (20 percent) of fragile soils occur within this area. Most of the fragile soils are due to high potential for water erosion and offsite sediment transport, and low revegetation potential.

Vegetation: Vegetation communities are predominately lodgepole pine and aspen. Riparian communities occur on about five acres of the unit. There are isolated locations of spotted knapweed. The Madison limestone features in this area contain about 220 acres (16 percent of the management area) of suitable habitat for *Shoshonea pulvinata*. There is moderate potential for oil and gas occurrence and development in this habitat area.

Prairie Falcons: This area contains a known prairie falcon nest. An additional nest is located on private land adjacent to the decision area. Both of these nests have been active in recent years. Widespread foraging opportunities exist immediately north of the decision area.

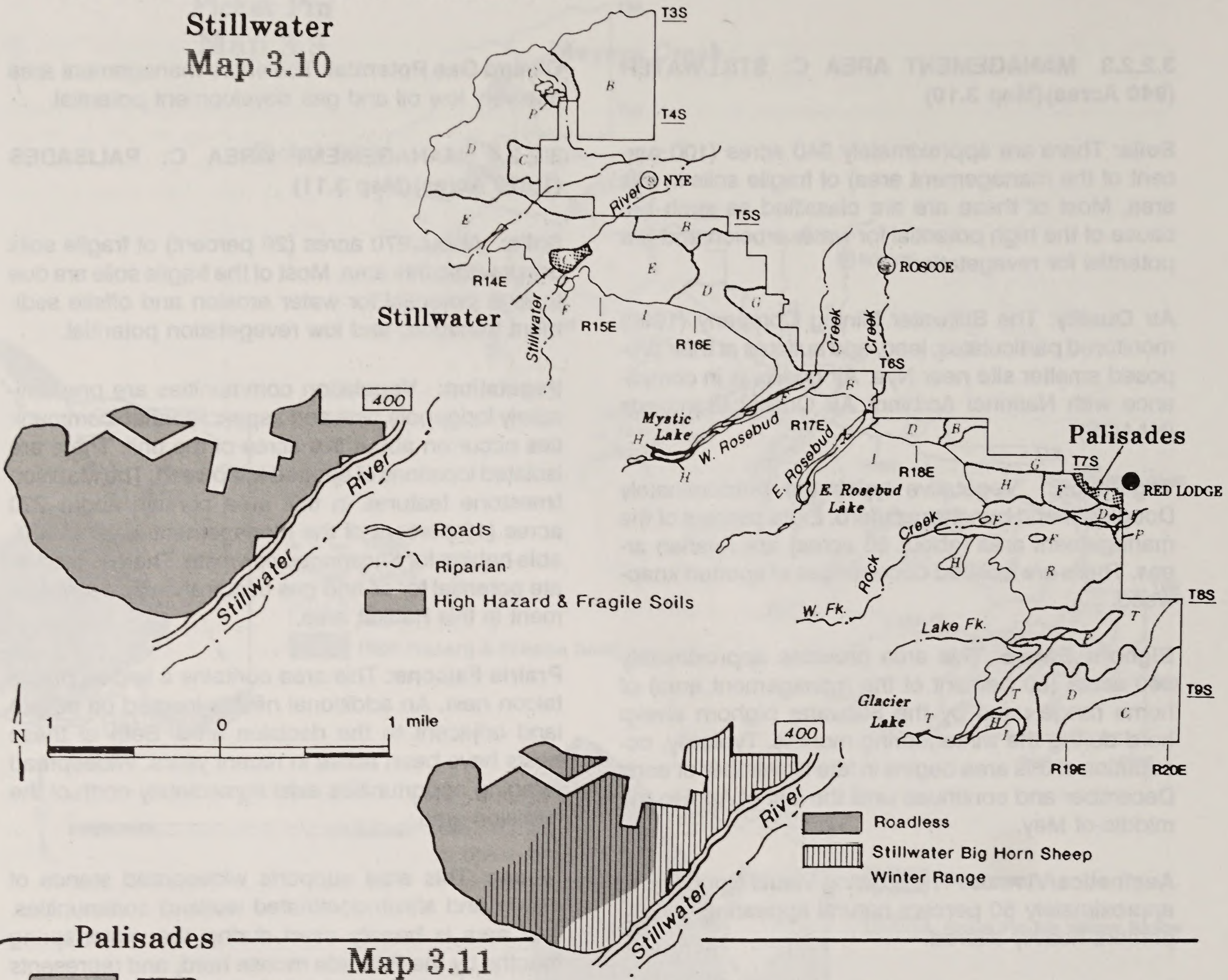
Moose: This area supports widespread stands of aspen and shrub-dominated wetland communities. The area is heavily used during the winter/spring months by the Palisade moose herd, and represents the best moose habitat within the eastern portion of the decision area. Approximately 340 acres (40 percent) within this management unit is considered winter/spring moose habitat.

Visuals: The existing visual condition is natural appearing.

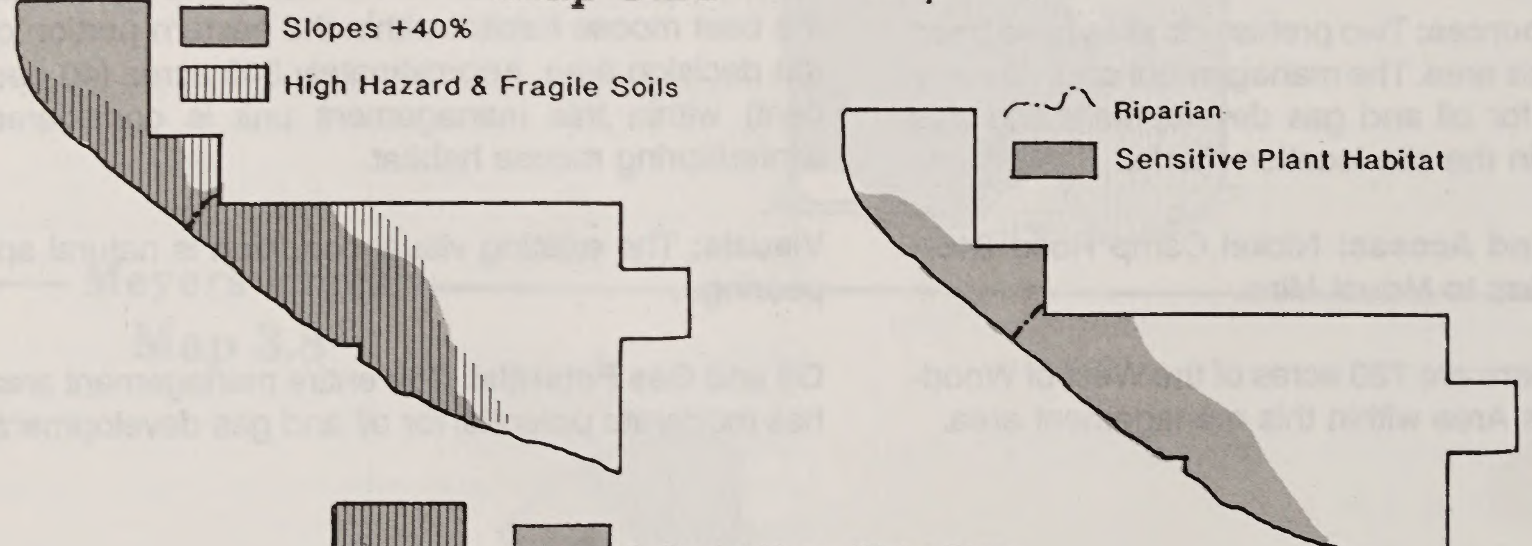
Oil and Gas Potential: The entire management area has moderate potential for oil and gas development.

- MANAGEMENT AREA C

Stillwater
Map 3.10



Palisades
Map 3.11



3.2.2.5 MANAGEMENT AREA C: LINE CREEK (10,490 Acres)(Map 3.12)

Soils: Thirty-five percent (approximately 3,760 acres) of the management area has fragile soils. Most fragile soils are due to high to very high potential for wind erosion, offsite sediment transport, water erosion potential, and low revegetation potential.

Vegetation: Vegetation communities are predominately bunchgrass, with Douglas-fir, limber pine, whitebark pine, and lodgepole pine. Dry alpine and aspen each constitute about one percent of this area. Riparian communities occur on about 480 acres (five percent). Alpine turf occurs on about 100 acres (one percent). There are isolated occurrences of leafy spurge and spotted knapweed. There are no known threatened or endangered plant species. However, *Shoshonea pulvinata* does occur in the adjacent Madison limestone, and in fact in the analysis area is always associated with the cobbly soil produced over the Madison. This unit may contain suitable habitat for *Shoshonea*, although it has not been mapped to date. The alpine portions of this unit contain about 270 acres (two percent) of suitable habitat for *Draba porsildii* and *Erigeron flabellifolius*. Oil and gas occurrence and development potential for this habitat is very low.

Eagle: There is a golden eagle nest in the area which has been occupied within the last 3 years. Additionally, there is suitable foraging habitat (2,010 acres, or 21 percent) in the prairie ecosystem immediately east of this area.

Elk: Approximately 5,340 acres (50 percent) of this area is utilized by the Line Creek elk herd, primarily during the winter/spring portions of the year. The area also contains 4,540 (43 percent) acres of summer/fall seasonal home range for the Line Creek herd.

Bighorn sheep: This area supplies 1,030 acres (ten percent) of winter/spring Bighorn sheep habitat. A portion which is adjacent to the Line Creek Plateau is utilized by the Rock Creek herd. However, most of the winter/spring range is in adjacent management areas.

Mountain goats: Approximately 3,620 acres (35 percent) of this management area is year-round habitat for the Line Creek Plateau herd. Recent studies indicate that goats utilize the same steep slopes in all seasons. Goats are not native to the Beartooth Ranger District, but have prospered since introduction in the 1940s. The Line Creek herd is the only herd within the decision area.

Aesthetics/Visuals: The existing visual condition is natural appearing.

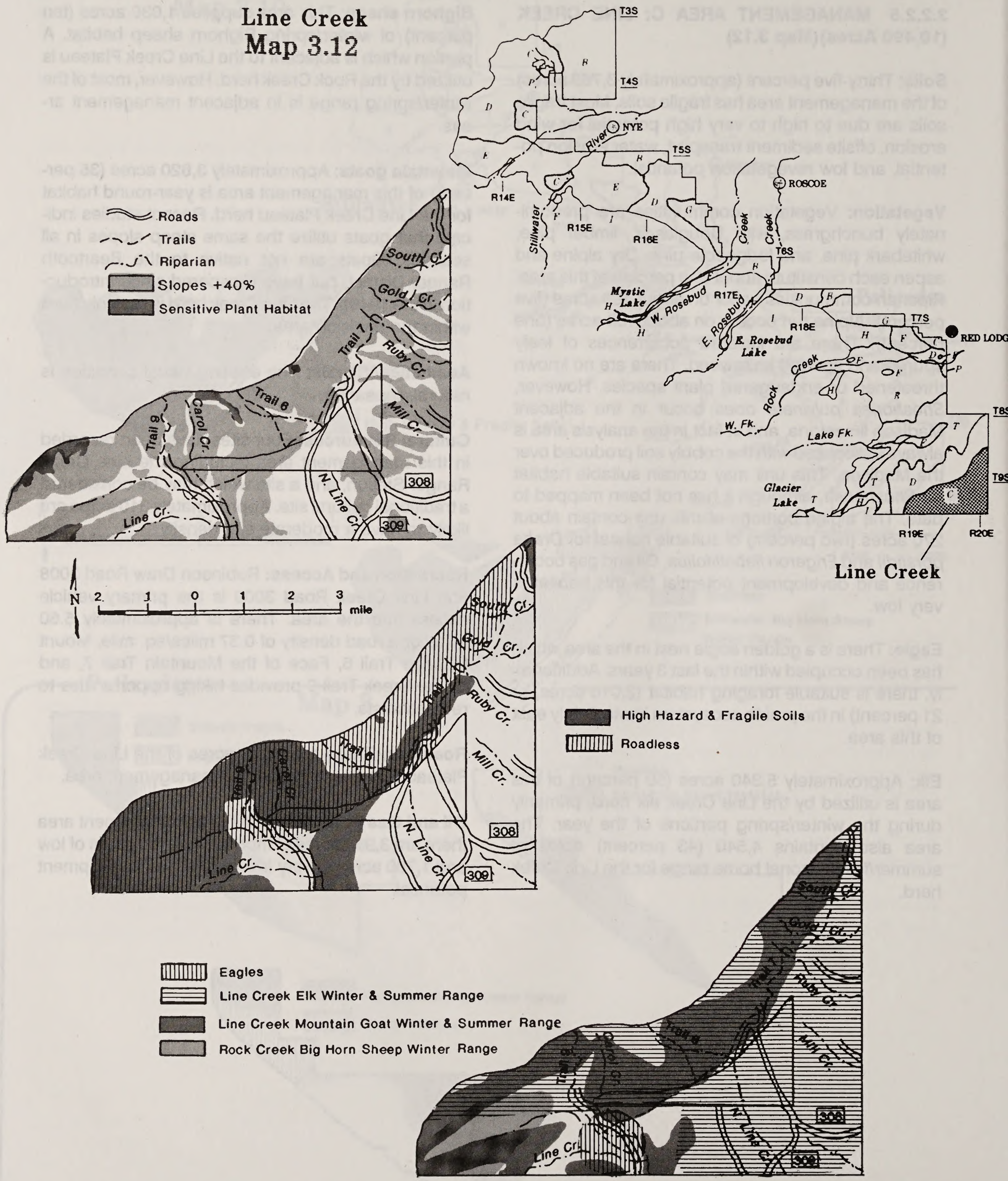
Cultural Resources: Four sites have been recorded in this management area including the Line Creek Ranger Station, and a site which may be considered a traditional cultural site. Approximately 310 acres are likely to have a moderate site density.

Recreation and Access: Robinson Draw Road 3008 and Line Creek Road 3009 is the primary vehicle access into the area. There is approximately 5.60 miles or a road density of 0.37 miles/sq. mile. Mount Maurice Trail 6, Face of the Mountain Trail 7, and Corral Creek Trail 9 provides hiking opportunities to recreationists.

Roadless: There are 4,880 acres of the Line Creek Plateau Roadless Area in this management area.

Oil and Gas Potential: Within this management area there are 3,980 acres of moderate, 4,730 acres of low and 1,780 acres of very low oil and gas development potential.

MANAGEMENT AREA C



Line Creek
Map 3.12

3.2.2.6 MANAGEMENT AREA C: COOKE CITY (5,890 Acres)(Map 3.13)

Soils: About 4,290 acres (72 percent) of fragile soils occur within this area. Most of the fragile soils are due to high potential for wind erosion, high to very high potential for water erosion, very high potential for offsite sediment transport, and low revegetation potential.

Vegetation: Vegetation communities are mostly rock, subalpine fire, whitebark pine, and dry alpine. There are about 830 acres (twelve percent) of dry alpine habitat in this management area, about 210 acres (three percent) of wet alpine habitat, whitebark pine occurs on about 620 acres (nine percent), riparian communities occur on about 1,030 acres (17 percent), and alpine turf occurs on about 1,230 acres (18 percent). There are no known threatened or endangered plant species. However, about 2,120 acres (36 percent) of the management area contain suitable habitat for several alpine species. Oil and gas occurrence and development in this habitat is very low.

Fisheries: Includes Yellowstone cutthroat trout. The area contains about 3.6 miles of suitable habitat which supports a population of cutthroat trout presumed to be genetically pure.

Grizzly Bears: This area provides home ranges for grizzly bears. The area is divided into two habitat classifications, MS1 and MS2. MS1 habitat is known to support a population of grizzly bears, and consists of approximately 2,740 acres (46 percent). MS2 habitat is suitable for grizzly bear use and occupation. Approximately 2,890 acres (49 percent) is contained in this management unit. Grizzlies use this area in the fall in search of white bark pine nuts.

Aesthetics/Visuals: The existing visual condition is heavily altered.

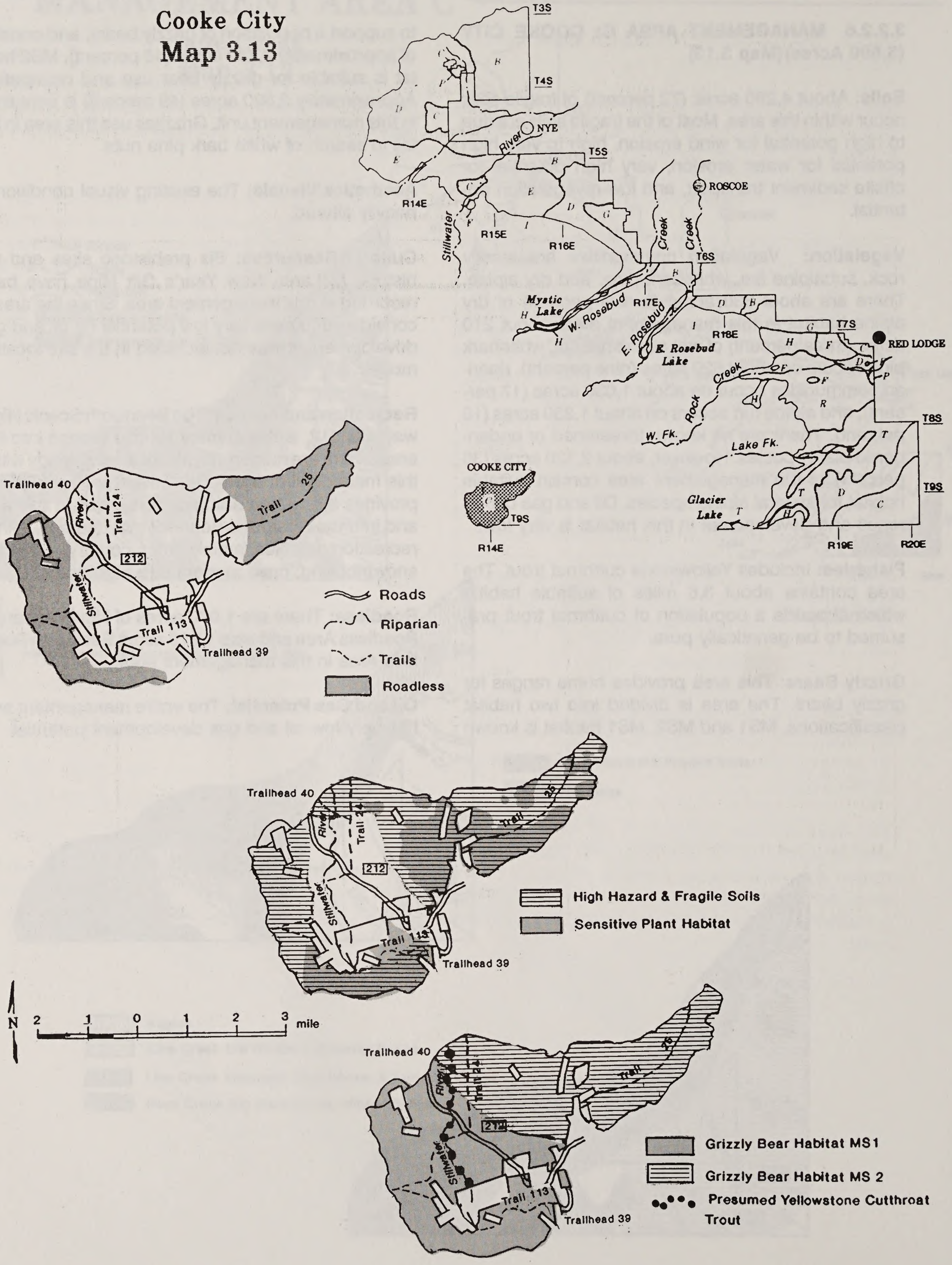
Cultural Resources: Six prehistoric sites and the historic McLaren New Year's Gift Mine have been recorded in this management area. Since the area is considered to have very low potential for oil and gas development, it was not included in the site location model.

Recreation and Access: The Beartooth Scenic Highway, US 212, is the primary vehicle access into this area. There are numerous private mining roads within this management area. The Stillwater River Trail 24 provides hiking and riding opportunities in this area and into the Absaroka-Beartooth Wilderness. Winter recreation activities, mainly cross-country skiing and snowmobiling, have moderate to high use.

Roadless: There are 1,070 acres of North Absaroka Roadless Area and also 1,210 acres Beartooth Roadless Area in this management area.

Oil and Gas Potential: The entire management area has very low oil and gas development potential.

Cooke City
Map 3.13



3.2.3 MANAGEMENT AREA D

The goal for Management Area D; as stated on page 53-57 of the Forest Plan is to: "Maintain or improve long-term diversity and quality of habitat for elk, bighorn sheep, black bear, and moose as well as accommodate oil and gas operations, livestock grazing, and timber harvest." The visual quality objective for Management Area D may range from retention to modification.

TABLE 3.23
Management Area D Resource/Issue Information

RESOURCE	Picket Pin	Fishtail	Butcher Creek	Palisades	Line Creek
Total Acres	23,250	11,850	1,890	1,370	11,700
SOILS and VEGETATION (acres)					
High Hazard and Fragile Soils	17,050	4,660	460	410	6,920
Sensitive Plant Habitat					6,090
Alpine species	110	150			
Shoshonea pulvinata	570		190	510	
Sensitive Plant Sites					3
Riparian Areas - MA M	620	810	40	30	330
Unique Plant Communities					
Wet/Dry Alpine	680				6,020
Mountain Meadows	40	20			
Whitebark Pine	1,960	800		60	2,830
FISH and WILDLIFE					
Sensitive Species					
Bats (acres pot. habitat)				1,500	150
Threatened and Endangered Species					
Gray Wolf (acres pot.hab)	23,980	12,180			11,670
Bald Eagle Habitat (acres)	250	90		250	
Peregrine Falcon Habitat (acres)	2,860	1,820	1,030	860	70
Raptors					
Golden Eagle Habitat (acres)	6,160	2,120	1,030	910	70
Prairie Falcon Habitat (acres)	6,160	2,120	1,030	910	70
Elk Home Ranges (acres)					
Black Butte Summer/Fall		8,160			
Picket Pin Winter/Spring	440				
Meyers Creek Winter/Spring	1,270				
Luther Summer/Fall			180		
Line Creek Summer/Fall					6,160
Line Creek Winter/Spring					2,420
Moose Home Range (acres)					
Lodgepole Creek Winter/Spring	730				
McDonald Basin Winter/Summer		5,530			
Palisades Winter/Spring				180	
Bighorn Sheep Home Range (acres)					
West Rosebud		3,330			
Rock Creek					680
Mountain Goat Home Range (acres)					
Line Creek					520
Other Free Ranging Carnivore					
Lynx (Denning/Foraging) (acres, pot. habit)	2,370/1,890	160/9,250	0/1,120	0/560	900/1,070
Marten (acres, pot.habit)	5,600	9,100	1,060	460	2,050
Wolverine (Denning/Foraging) (acres, pot. habit)	6,380/340	1,000/580	0/200	0/60	9,570/0
AESTHETICS					
Visuals; Slopes >40% (acres)	13,670	4,230	840	620	4,610

RESOURCE	Picket Pin	Fishtail	Butcher Creek	Palisades	Line Creek
RECREATION AND ACCESS					
Miles of Road					
Primitive	21.57	4.68			1.52
Aggregate				2.98	
RIM Trails and Trailheads	14.36	7.58		1.55	16.51
CULTURAL RESOURCES					
Cultural Sites	3				10
ROADLESS AREAS (acres)					
# 01371 North Absaroka	9,890				
# 01911 Line Creek Plateau					11,030
# 01366 Fishtail Saddleback		8,240			
OIL and GAS RELATED (acres)					
Oil and Gas Development Potential					
High		650			
Moderate		2,310	1,290	1,370	200
Low	13,150	8,890	600		9,320
Very Low	10,100				2,180
Well Sites		1			

3.2.3.1 MANAGEMENT AREA D: PICKET PIN (23,250 Acres)(Map 3.14)

Soils: There are approximately 17,050 acres (73 percent of the management area) of fragile soils in this area. Most of the fragile soils are due to high to very high potential for wind and water erosion, high potential for offsite sediment transport, and low revegetation potential.

Vegetation: Vegetation communities are mostly Douglas-fir with 620 acres (three percent) of riparian communities in the unit. There are isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. The upper reaches of this area contain about 110 acres and about 570 acres (two percent) suitable habitat for *Shoshonea pulvinata*.

Elk: There are about 440 acres (two percent) of core winter/spring range for the Picket Pin elk herd. The Picket Pin herd does not make extensive use of this area until the end of the big game season. Also, this area supplies 1,270 acres (eight percent) of core winter/spring range for the Meyers Creek elk herd. Elk are widely distributed throughout the management unit.

Moose: The area contains some aspen and shrub-dominated wetland communities which in turn limits the distribution of moose in this management area. These vegetative communities provide winter/spring home range for the Lodgepole Creek herd, which uses about 730 acres (three percent) of the management area. Moose use in this area is similar to that use which occurs in other habitats.

Aesthetics/Visuals: The existing visual condition is mostly natural appearing with portions being slightly altered.

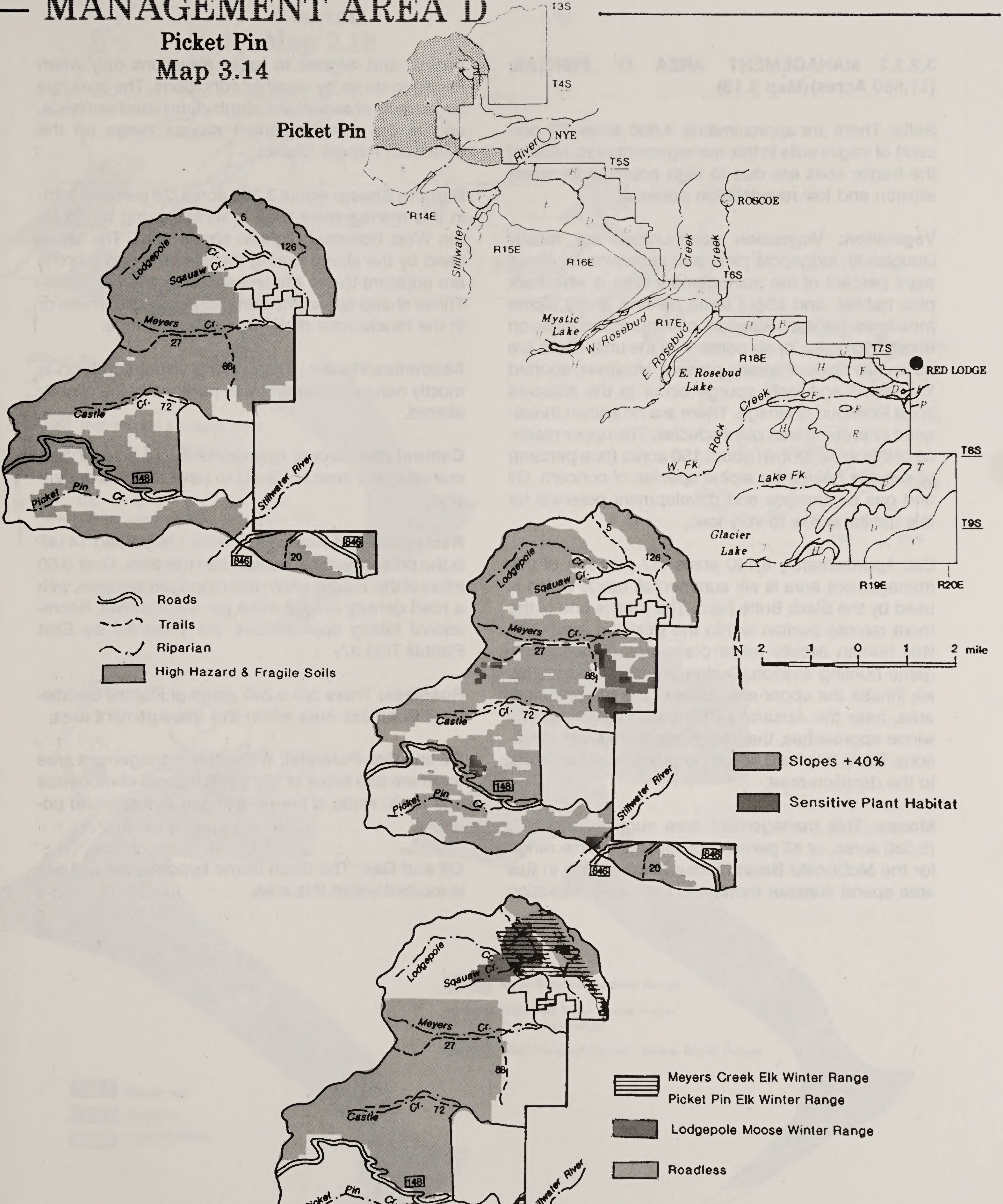
Cultural: Three cultural sites have been identified in this management area. One is the Murphy Ditch and one may be considered a traditional cultural property. Twenty acres are likely to have a high site density and ten acres are likely to have a moderate site density.

Recreation and Access: Picket Pin Road 140 and Lodge Pole Creek Road 142 provide the main vehicle access into the area. There are approximately 21.57 miles of road within this management area, with a road density of 0.58 miles per square mile. Recreational hiking opportunities are provided by Meyers Creek Trail 27, Castle Creek Trail 72, Dead Indian Trail 83, and Pass Creek Trail 88

Roadless: There are 9,890 acres of North Absaroka Roadless Area within this management area.

Oil and Gas Potential: Within the management area there area 13,150 acres of low and 10,100 acres of very low oil and gas development potential.

Picket Pin
Map 3.14



3.2.3.2 MANAGEMENT AREA D: FISHTAIL (11,850 Acres)(Map 3.15)

Soils: There are approximately 4,660 acres (39 percent) of fragile soils in this management area. Most of the fragile soils are due to high potential for water erosion and low revegetation potential.

Vegetation: Vegetation communities are mostly Douglas-fir, lodgepole pine, and subalpine fir. About eight percent of the management area is whitebark pine habitat, and about three percent is dry alpine meadows habitat. Riparian communities occur on about 810 acres, or six percent, of the unit. There are no known noxious weeds present. However, spotted knapweed and leafy spurge occur in the adjacent West Rosebud drainage. There are no known threatened or endangered plant species. The upper reaches of this area contain about 150 acres (one percent) of suitable habitat for alpine species of concern. Oil and gas occurrence and development potential for this habitat is low to very low.

Elk: Approximately 8,160 acres (67 percent) of this management area is elk summer/fall range which is used by the Black Butte herd. The area is one of the more remote portion within the decision area, and little human activity takes place except during big game hunting season. During the summer months, elk inhabit the upper elevations of the management area, near the Absaroka-Beartooth Wilderness. As winter approaches, the herd migrates to lower elevations. Elk in this herd winter on private land adjacent to the decision area.

Moose: This management area supplies the bulk (5,530 acres, or 45 percent) of seasonal home range for the McDonald Basin Moose herd. Moose in this area spend summer months in the higher elevation basins, and migrate to lower elevations only when forced to do so by weather conditions. The area has large tracts of aspen and shrub-dominated wetlands, and is the most important moose range on the Beartooth Ranger District.

Bighorn Sheep: About 3,330 acres (28 percent) within this management area is winter/spring range for the West Rosebud bighorn sheep herd. The areas used by the sheep during the winter/spring months are adjacent to the Absaroka-Beartooth Wilderness. These sheep spend the summer in the wilderness or in the headwaters of the Stillwater drainage.

Aesthetics/Visuals: The existing visual condition is mostly natural appearing with portions being slightly altered.

Cultural Resources: Approximately 70 acres in this management area are likely to have a high site density.

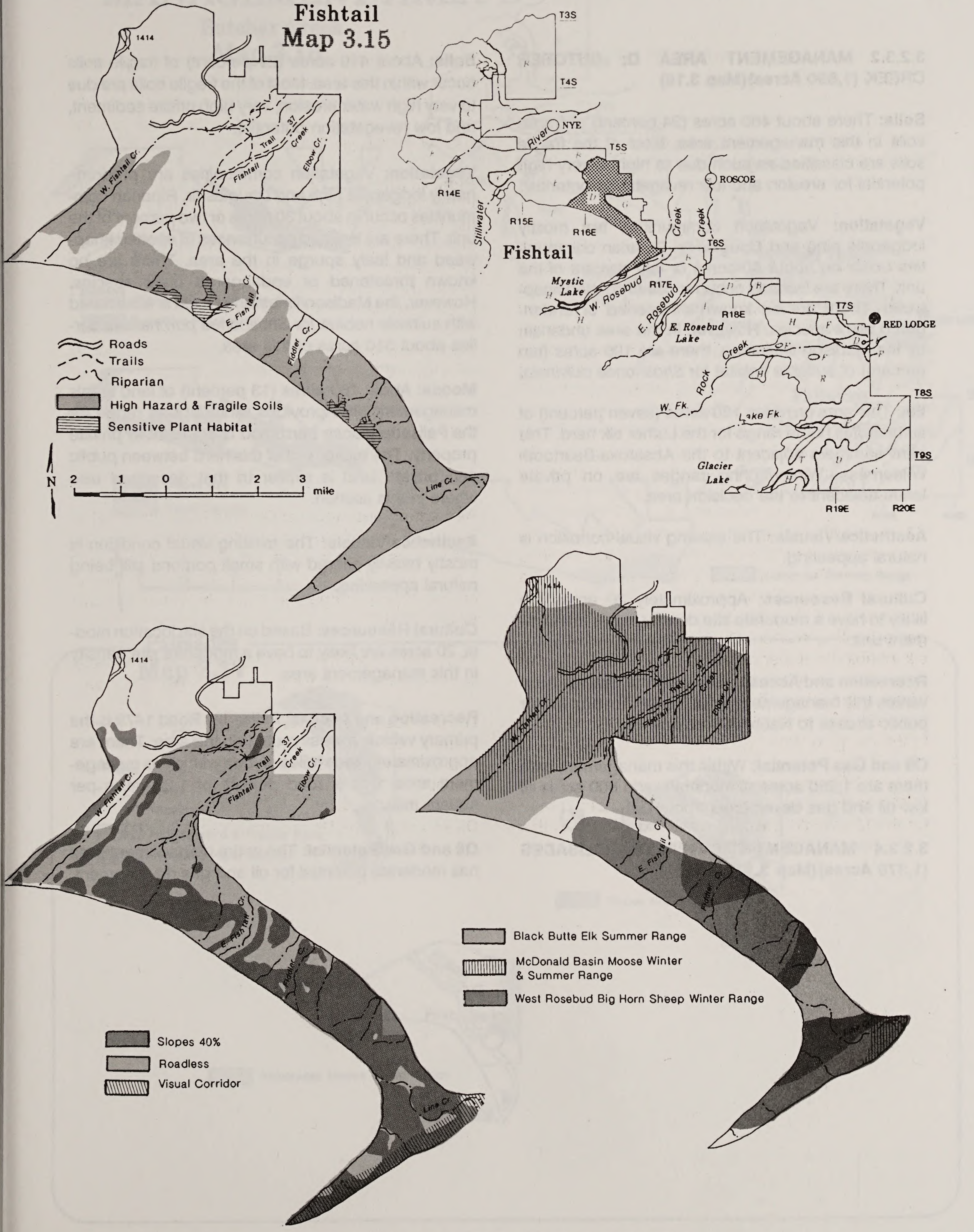
Recreation and Access: Chrome Lake Road 1414F is the primary vehicle access into the area. Over 3.60 miles of this road is within this management area, with a road density of 0.58 miles per square mile. Recreational hiking opportunities are provided by East Fishtail Trail 37.

Roadless: There are 8,240 acres of Fishtail Saddleback Roadless Area within this management area.

Oil and Gas Potential: Within this management area there are 650 acres of high, 2,310 acres of moderate and 8,890 acres of low oil and gas development potential.

Oil and Gas: The Dean Dome hypothetical well site is located within this area.

MANAGEMENT AREA D



Fishtail
Map 3.15

3.2.3.3 MANAGEMENT AREA D: BUTCHER CREEK (1,890 Acres)(Map 3.16)

Soils: There about 460 acres (24 percent) of fragile soils in this management area. Most of the fragile soils are classified as such due to high to very high potential for erosion and low revegetation potential.

Vegetation: Vegetation communities are mostly lodgepole pine and Douglas-fir. Riparian communities occur on about 40 acres or two percent of the unit. There are isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. However, in the area underlain by the Madison limestone, there are 190 acres (ten percent) of suitable habitat for *Shoshonea pulvinata*.

Elk: This area provides 180 acres (seven percent) of summer/fall home range for the Luther elk herd. This herd summers adjacent to the Absaroka-Beartooth Wilderness. Winter/spring ranges are on private lands adjacent to the decision area.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: Approximately 20 acres are likely to have a moderate site density in this management unit.

Recreation and Access: Although a private road traverses this management area, it does not provide for public access to National Forest lands.

Oil and Gas Potential: Within this management area there are 1,290 acres of moderate and 600 acres of low oil and gas development potential.

3.2.3.4 MANAGEMENT AREA D: PALISADES (1,370 Acres)(Map 3.17)

Soils: About 410 acres (29 percent) of fragile soils occur within this area. Most of the fragile soils are due to very high water erosion, very high offsite sediment, and low revegetation potential.

Vegetation: Vegetation communities are predominately lodgepole pine and Douglas-fir. Riparian communities occur in about 30 acres or two percent of the unit. There are isolated occurrences of spotted knapweed and leafy spurge in the area. There are no known threatened or endangered plant species. However, the Madison limestone which is associated with suitable habitat for *Shoshonea pulvinata* underlies about 510 acres of this area.

Moose: About 180 acres (13 percent) of land in this management area provides winter/spring range for the Palisade Moose herd, and is adjacent to private property. The movement of this herd between public and private land is similar to that described else where in this section.

Aesthetics/Visuals: The existing visual condition is mostly heavily altered with small portions still being natural appearing.

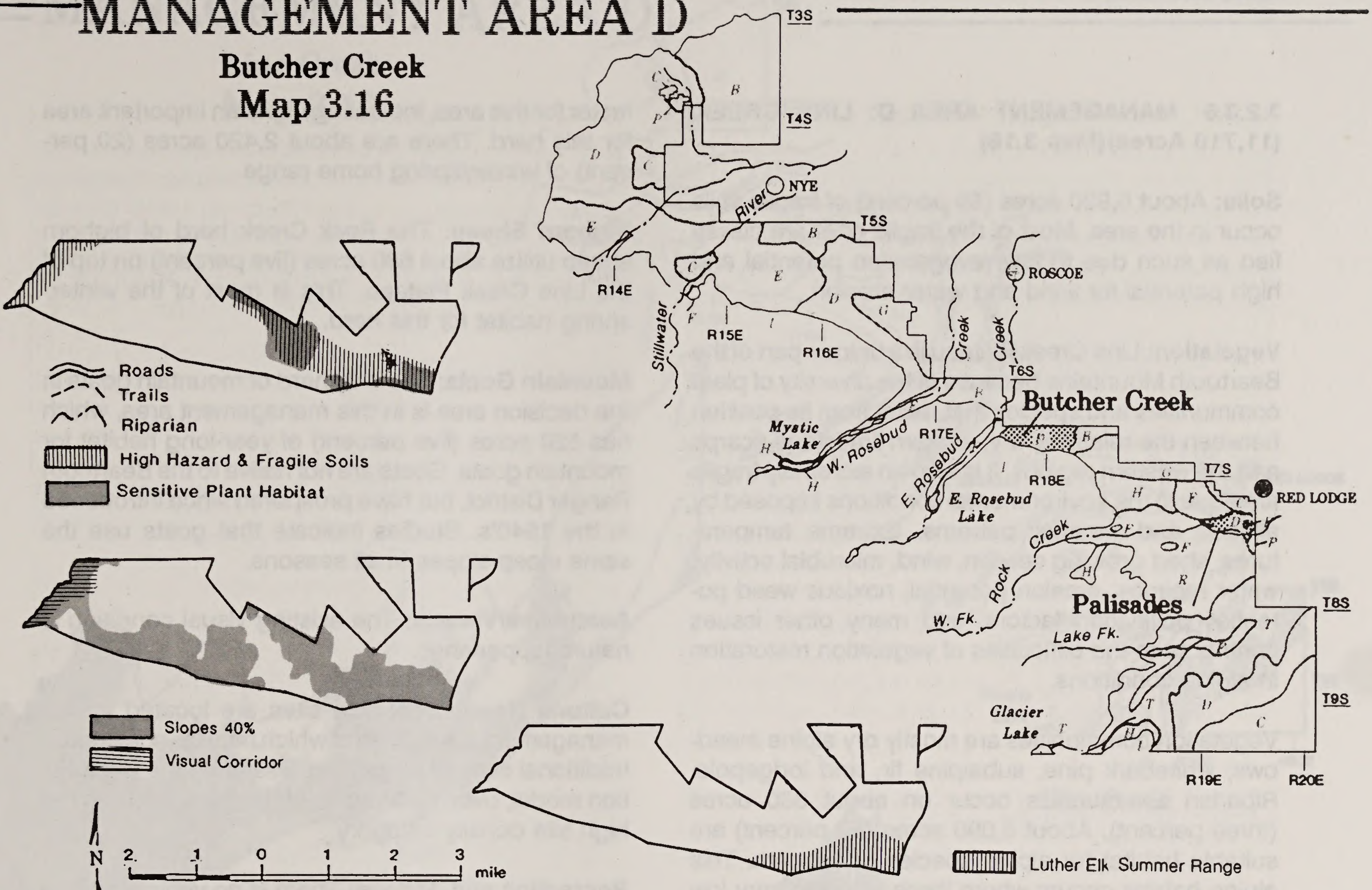
Cultural Resources: Based on the site location model, 20 acres are likely to have a moderate site density in this management area.

Recreation and Access: Palisades Road 1479 is the primary vehicle access route into the area. There are approximately three miles of road within this management area, with a road density of 1.28 miles per square mile.

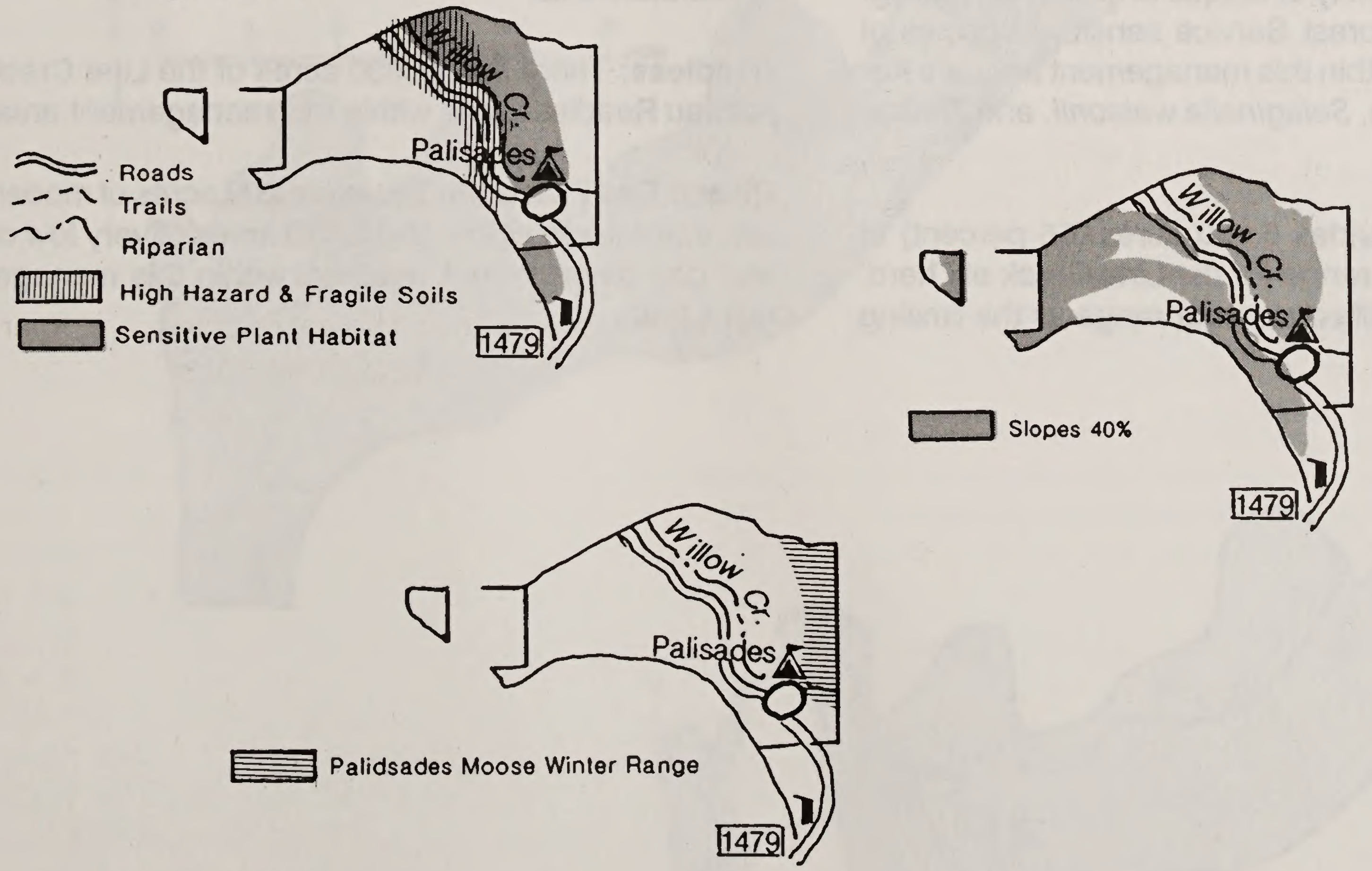
Oil and Gas Potential: The entire management area has moderate potential for oil and gas development.

MANAGEMENT AREA D

Butcher Creek
Map 3.16



Palisades
Map 3.17



3.2.3.5 MANAGEMENT AREA D: LINE CREEK (11,710 Acres)(Map 3.18)

Soils: About 6,920 acres (59 percent) of fragile soils occur in the area. Most of the fragile soils are classified as such due to low revegetation potential and high potential for wind and water erosion.

Vegetation: Line Creek Plateau is a unique part of the Beartooth Mountains because of the diversity of plant communities and species that result from its position between the relatively dry, eastern limestone scarps and the western regions. It is also an extremely fragile area due to the environmental conditions imposed by altitude and weather patterns. Extreme temperatures, short growing season, wind, microbial activity, water regimes, erosion potential, noxious weed potential, pollination factors, and many other issues contribute to the difficulties of vegetation restoration in alpine conditions.

Vegetation communities are mostly dry alpine meadows, whitebark pine, subalpine fir, and lodgepole. Riparian communities occur on about 330 acres (three percent). About 6,090 acres (52 percent) are suitable habitat for alpine species of concern. This alpine habitat occurs where there is low to very low potential for oil and gas occurrence and development. See the analysis record for a full description of the vegetation found in and adjacent to this area. This area contains a variety of unique and interesting vegetation species. Forest Service sensitive species of special concern within this management area are *Kobresia macrocarpa*, *Selaginella watsonii*, and *Thalspi parviflorum*.

Elk: This area provides 6,160 acres (55 percent) of summer/fall home range for the Line Creek elk herd. Studies have identified summer range as the limiting factor for this area, indicating this is an important area for this herd. There are about 2,420 acres (20 percent) of winter/spring home range.

Bighorn Sheep: The Rock Creek herd of bighorn sheep utilize about 680 acres (five percent) on top of the Line Creek Plateau. This is most of the winter/spring habitat for this herd.

Mountain Goats: The only herd of mountain goats in the decision area is in this management area, which has 520 acres (five percent) of year-long habitat for mountain goats. Goats are not native to the Beartooth Ranger District, but have prospered since introduced in the 1940's. Studies indicate that goats use the same steep slopes in all seasons.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: Ten sites are located in this management area, three of which may be considered traditional cultural properties. Based on the site location model, over 1,300 acres of this area falls into the high site density category.

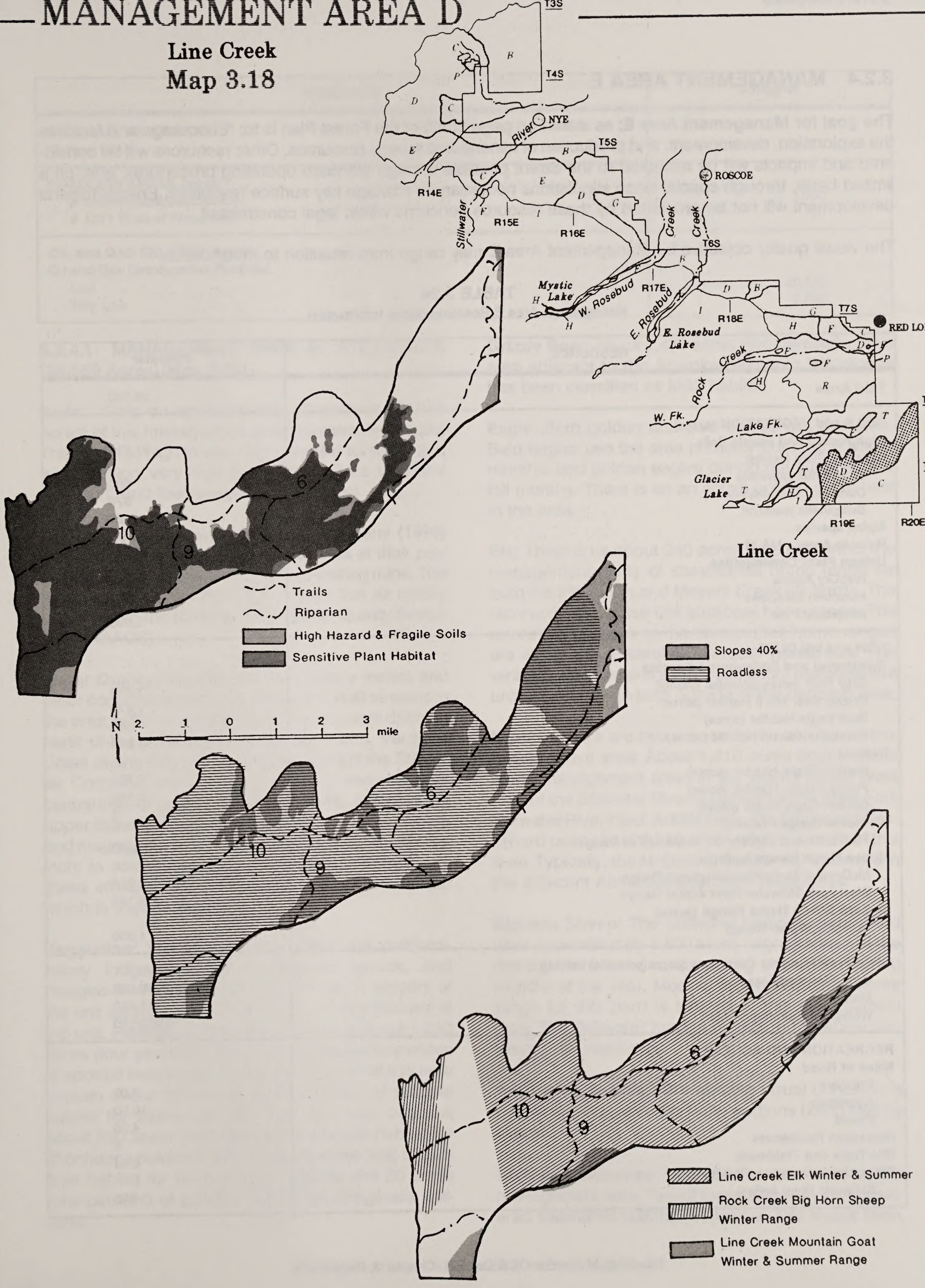
Recreation and Access: There is no vehicle access into this area, as it is in the Line Creek Roadless Area. Mount Maurice Trail 6, Corral Creek Trail 9, and Line Creek Plateau Trail 10 provides hiking opportunities to recreationists.

Roadless: There are 11,030 acres of the Line Creek Plateau Roadless area within this management area.

Oil and Gas Potential: There are 200 acres of moderate, 9,320 acres of low and 2,180 acres of very low oil and gas development potential within this management area.

MANAGEMENT AREA D

Line Creek
Map 3.18



3.2.4 MANAGEMENT AREA E

The goal for Management Area E; as stated on page 58-60 of the Forest Plan is to: "Encourage and facilitate the exploration, development, and production of mineral and energy resources. Other resources will be considered and impacts will be mitigated to the extent possible through standard operating procedures, and, on a limited basis, through special lease stipulations necessary to manage key surface resources. Energy/mineral development will not be precluded by these resource concerns within legal constraints."

The visual quality objective for Management Area E may range from retention to modification.

TABLE 3.24
Management Area E Resource/Issue Information

RESOURCE	Stillwater
Total Acres	26,560
SOILS and VEGETATION (acres)	
High Hazard and Fragile Soils	21,910
Sensitive Plant Habitat	
Shoshonea pulvinata	690
Gentianopsos simplex	970
Selaginella watsonii	20
Alpine species	710
Riparian Areas - MA M	1,230
Unique Plant Communities	
Wet/Dry Alpine	770
Mountain Meadows	20
Whitebark Pine	2,990
FISH and WILDLIFE	
Threatened and Endangered Species	
Gray Wolf (acres potential habitat)	7,680
Grizzly Bear MS II Habitat (acres)	1,470
Bald Eagle Habitat (acres)	560
Peregrine Falcon Habitat (acres)	1,640
Raptors	
Golden Eagle Habitat (acres)	2,460
Prairie Falcon Habitat (acres)	2,460
Golden Eagle Nests (nests)	1
Elk Home Ranges (acres)	
Picket Pin and Meyers Cr. Summer/Fall Range	240
Moose Home Range (acres)	
McDonald Basin Winter/Summer Range	2,010
West Fork Stillwater River Winter Range	1,160
Bighorn Sheep Home Range (acres)	
Stillwater Winter Range	1,800
Other Free Ranging Carnivore (acres potential habitat)	
Lynx (Denning/Foraging)	2,140/10,060
Marten	11,690
Wolverine (Summer/Winter)	5,400/120
RECREATION AND ACCESS	
Miles of Road	
Primitive	7.00
Aggregate	10.00
Paved	4.20
Recreation Residences	5
RIM Trails and Trailheads	6.83
Proposed Recreation Rivers	
Stillwater River (miles)	890

RESOURCE	Stillwater
CULTURAL RESOURCES	
Cultural Sites	9
ROADLESS AREAS (acres)	
# 1366 Fishtail/Saddleback	5,050
# 1371 West of Woodbine	760
OIL and GAS RELATED (acres)	
Oil and Gas Development Potential	
Low	20,530
Very Low	6,030

3.2.4.1 MANAGEMENT AREA E: STILLWATER (26,560 Acres)(Map 3.19)

Soils: Soils on approximately 82 percent (21,910 acres) of this management area are classified fragile. This is due to high to very high potential for water and wind erosion, very high potential for offsite sediment transport, and low revegetation potential.

Air Quality: The Stillwater Mining Company (1990) monitors particulates, lead, and sulfates at their proposed smelter site near Nye, at the existing mine. The most recent monitoring (1990) shows that air quality is well within the National Ambient Air Quality Standards (NAAQS).

Water Quality: Concentrations of heavy metals and other contaminants are extremely low in all streams in the area, with the exception of a few streams draining parts of the Stillwater Complex formation. Verdigris Creek drains the unstable gossan area of the Stillwater Complex, and is often turbid and contains concentrations of copper, nickel, and zinc. Water in the upper Stillwater Basin is degraded by iron, aluminum and magnesium sulfates and sulfuric acid which originate in acid drainage from old mines. Samples of these effluents show measured pH as low as 2.5 which is toxic to aquatic life.

Vegetation: Vegetation communities are predominately lodgepole pine, Engelmann spruce, and Douglas-fir. Whitebark pine occurs on 11 percent of the unit and dry alpine meadows on three percent of the unit. Riparian communities make up about 1,230 acres (four percent). There are isolated occurrences of spotted knapweed. The upper reaches of this area contain about 710 acres (three percent) of suitable habitat for alpine species. The area also contains about 690 acres (two percent) of suitable habitat for *Shoshonea pulvinata*, 970 acres (four percent) of suitable habitat for *Gentianopsis simplex* and 20 acres (one percent) of suitable habitat for *Selaginella watsonii.*

Grizzly Bear: About 1,470 acres (five percent) of this area adjacent to the Asaroka-Beartooth Wilderness has been classified as MS2 habitat.

Eagle: Both golden and bald eagles use this area. Bald eagles use the area primarily during the winter months, and golden eagles during the summer and fall months. There is an an active golden eagle nest in the area.

Elk: There area about 240 acres (one percent of the management area) of summer/fall home range for both the Picket Pin and Meyers Creek elk herds. The two herds jointly use this seasonal home range. The remaining portions of the summer/fall home ranges are within the Absaroka-Beartooth Wilderness. The winter/spring range is either in adjacent management units or on private land outside of the decision area.

Moose: There are two moose herds which use this management area. About 1,610 acres (four percent of the management area) in the vicinity of the West Fork of the Stillwater River is habitat for the West Fork Stillwater River herd. Additionally, the McDonald Basin herd uses about 2,010 acres (eight percent) of this area. Typically, the McDonald Basin herd summers in the adjacent Absaroka-Beartooth Wilderness.

Bighorn Sheep: The Stillwater bighorn sheep herd uses approximately 1,800 acres (eight percent of the management area) area during the winter/spring months of the year. Most of the winter/spring home range for this herd is located in this management area. The Stillwater herd summers in the Absaroka-Beartooth Wilderness.

Aesthetics/Visuals: The existing visual condition is mostly natural appearing with portions being slightly altered.

Cultural Resources: Nine sites are on record for this management area. Two of these sites may be considered traditional cultural properties. The Mouat Mine, Mountain View, and the Benbow mine area are located in this unit. The management area has low to very low potential for oil and gas development and was not included in the site location model.

Recreation and Access: Woodbine Road 400, Benbow Road 1414, Road 846, and miscellaneous four wheel drive roads provides the public with vehicle access on National Forest lands. This management area contains several private roads that is associated with mining activities. Head of Cathedral Trail 20 provides recreationists with hiking opportunities. Recreation residences occurs in this management area along the Stillwater River.

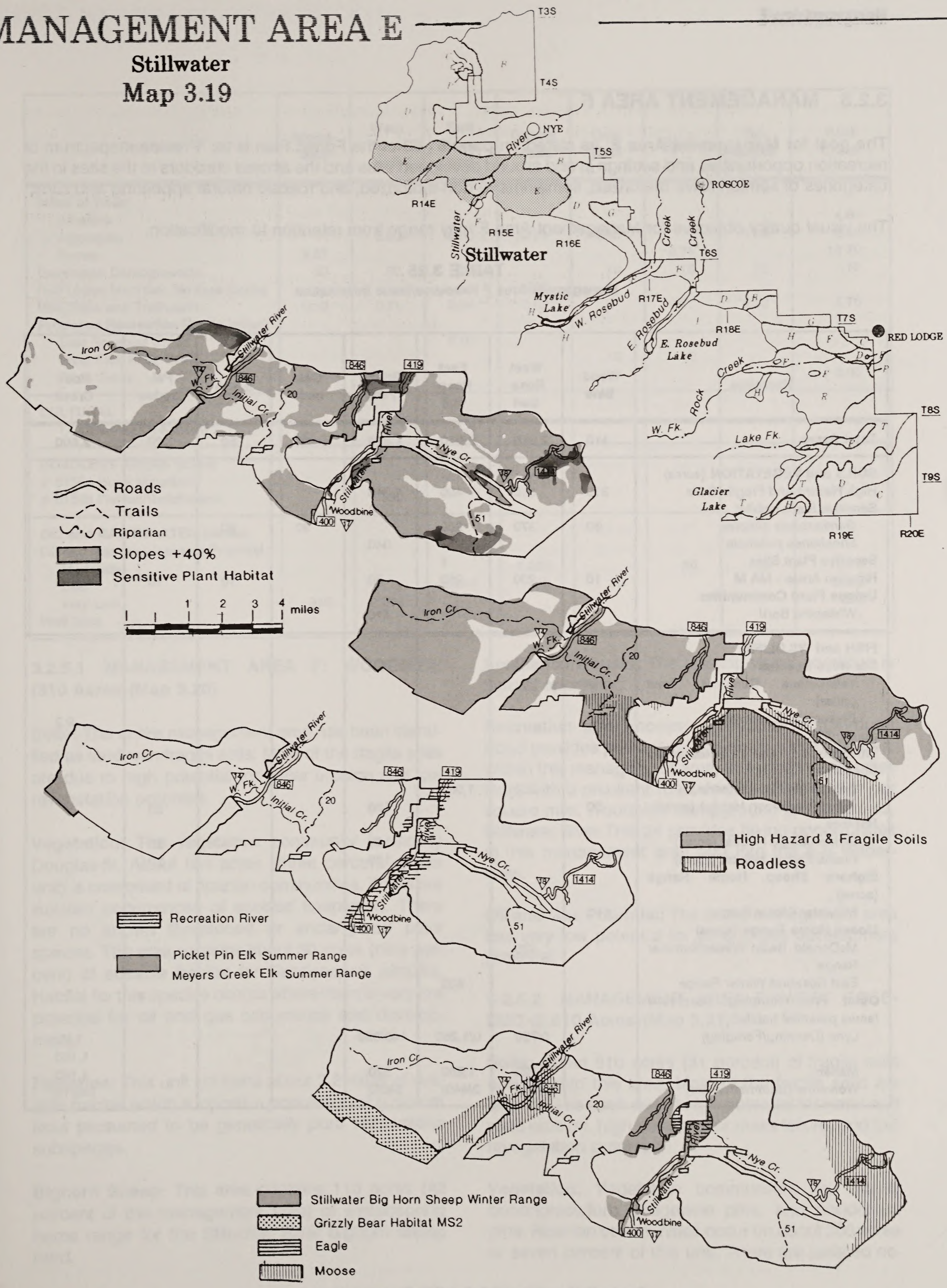
Roadless: The roadless areas within this management area are Fishtail Saddleback (5,050 acres) and West of Woodbine (760 acres).

Oil and Gas Potential: There are 20,530 acres of low and 6,030 acres of very low oil and gas development potential within the management area.

MANAGEMENT AREA E

Stillwater

Map 3.19



3.2.5 MANAGEMENT AREA F

The goal for Management Area F; as stated on page 61-63 of the Forest Plan is to: "Provide a spectrum of recreation opportunities and settings in and around developed sites and the access corridors to the sites in the categories of semiprimitive motorized, semiprimitive non-motorized, and roaded natural appearing and rural."

The visual quality objective for Management Area F may range from retention to modification.

TABLE 3.25
Management Area F Resource/Issue Information

Resource	Woodbine	West Rosebud	East Rosebud	Grizzly Peak	Cascade	Basin	Palisades	Rock Creek
Total Acres	**310**	**2,610**	**2,010**	**1,870**	**30**	**50**	**20**	**2,600**
SOILS and VEGETATION (acres)								
High Hazard and Fragile Soils	310	810	400	1,340				510
Sensitive Plant Habitat								
Gentianopsis simplex	30	370	900		30	50		
Shoshonea pulvinata				340				
Sensitive Plant Sites			1					
Riparian Areas - MA M	10	200	250	30		10	10	340
Unique Plant Communities								
Whitepine Bark				410				
FISH and WILDLIFE								
Sensitive Species								
Yellowstone Cutthroat Trout (miles)								
Presumed genetically pure (miles)	2.2							9.2
Threatened and Endangered Species								
Bald Eagle Habitat (acres)		950	1,080					
Peregrine Falcon Habitat (acres)	50			130			20	
Raptors								
Golden Eagle Habitat (acres)				130			20	
Prairie Falcon Habitat (acres)				130			20	
Bighorn Sheep Home Range (acres)								
Stillwater Winter Range	110							
Moose Home Range (acres)								
McDonald Basin Winter/Summer Range		430						
East Rosebud Winter Range			500					
Other Free Ranging Carnivore (acres potential habitat)								
Lynx (Denning/Foraging)		0/720	0/1,280	140/890				140/ 1,100
Marten		720	1,280	820				1,100
Wolverine (Summer/Winter)		0/110	0/440/	540/0				140/10

Resource	Wood-bine	West Rose-bud	East Rose-bud	Grizzly Peak	Cas-cade	Basin	Pal-isades	Rock Creek
Miles of Road								
Primitive								4.80
Aggregate		8.90	6.50	0.73	0.60		0.18	2.80
Paved	2.07					0.71		13.70
Developed Campgrounds	50	30	30		10	10	10	170
Red Lodge Mountain Ski Area (acres)				220				
RIM Trails and Trailheads	0.10	0.71	0.84	0.60		0.03	0.03	4.70
Proposed Recreation Rivers (miles)								
East Rosebud Creek			6.00					
West Fork Rock Creek					.10	.10		
Rock Creek								6.00
CULTURAL								
Cultural Sites (Number)			5					1
ROADLESS AREAS (acres)								
# 01364 Burnt Mountain				720				
# 01366 Fishtail/Saddleback		390						
OIL and GAS RELATED (acres)								
Oil and Gas Development Potential								
Moderate				1,200		50	20	1,170
Low			2,010	480	30			1,050
Very Low	310	2,610						380
Well Sites								1

3.2.5.1 MANAGEMENT AREA F: WOODBINE (310 Acres)(Map 3.20)

Soils: The entire management area has been identified as land with fragile soils. Most of the fragile soils are due to high potential for water erosion and low revegetation potential.

Vegetation: The vegetation community is mostly Douglas-fir. About ten acres (three percent of this unit) is comprised of riparian communities. There are isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. The area contains about 30 acres (nine percent) of suitable habitat for *Gentianopsis simplex*. Habitat for this species occurs where there is very low potential for oil and gas occurrence and development.

Fisheries: This unit contains about 2.2 miles of suitable habitat which supports a population of cutthroat trout presumed to be genetically pure Yellowstone subspecies.

Bighorn Sheep: This area contains 110 acres (42 percent of the management area) of winter/spring home range for the Stillwater River bighorn sheep herd.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Recreation and Access: Woodbine Campground Road provides primary vehicle access into this area. Within this management area, this road is 2.07 miles long, with a resultant road density of 4.73 miles per square mile. Woodbine Campground is in this area. Stillwater River Trail 24 provides hiking opportunities in this management area and into the A-B Wilderness.

Oil and Gas Potential: The entire management area has very low potential for oil and gas development potential.

3.2.5.2 MANAGEMENT AREA F: WEST ROSEBUD (2,610 Acres)(Map 3.21)

Soils: About 810 acres (31 percent) of fragile soils occur within this area. Most of the fragile soils are classified as such due to high potential for water and wind erosion, high potential for mass failure, and low revegetation potential.

Vegetation: Vegetation communities are mostly bunchgrass/forb, lodgepole pine, and ponderosa pine. Riparian communities occur on about 200 acres or seven percent of this unit. There are isolated occurrences of spotted knapweed and leafy spurge. There are no known threatened or endangered plant species. The valley bottoms of this area contain approximately 370 acres of suitable habitat for *Gentianopsis simplex*, which is 14 percent of the area.

Moose: This area contains the eastern extension of the McDonald Basin Moose herd. Vegetation utilized by moose in this area is similar to that previously described, except location of this vegetation is on the adjacent west bench of the area. Most moose use, therefore, is concentrated in this area rather than in the West Rosebud Creek riparian zone. About 430 acres (16 percent of the management area) of moose home range is in this management unit.

Aesthetics/Visuals: The existing visual condition is mostly altered only slightly with portions still being natural appearing.

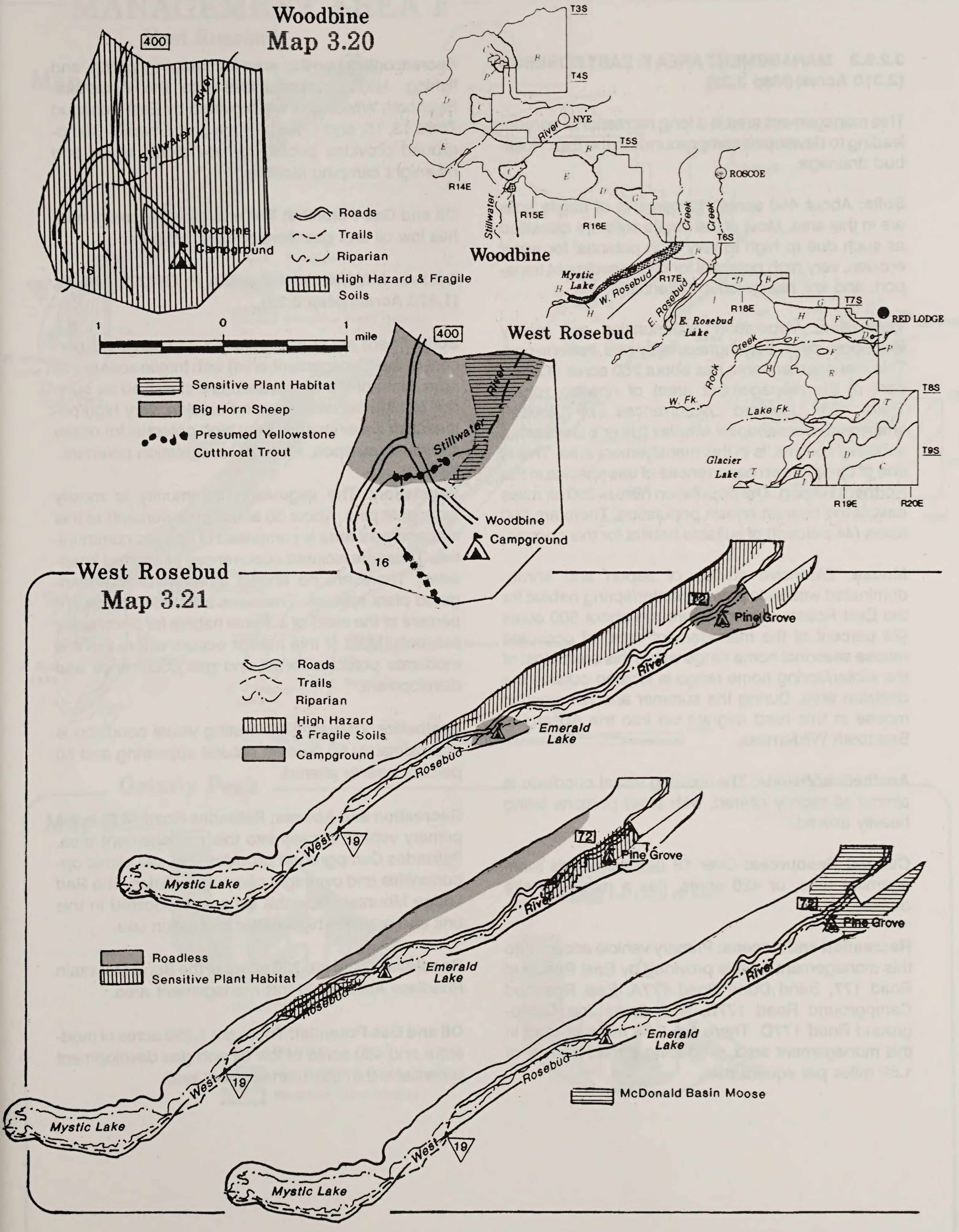
Cultural Resources: Five prehistoric sites are recorded in this management area. Approximately 330 acres are likely to have a moderate site density.

Recreation and Access: West Rosebud Road 72, Pine Grove Campground Road 72A, and Emerald Lake Road 72C provide the primary vehicle access into the area. The management area has 8.90 miles of road, for a road density of 1.82 miles per square mile. West Rosebud Trail 19 provides hiking opportunities into the management area and also into the Absaroka-Beartooth Wilderness. Emerald and Pine Grove Campgrounds provides the public with day-use picnic areas and overnight camping facilities. The Mystic Lake Hydroelectric Plant, along with housing for employees, is located in this area. A recreation residence is also in this management area.

Roadless: There are 390 acres of the Fishtail/Saddleback Roadless Area within this management area.

Oil and Gas Potential: The entire management area has very low potential for oil and gas development.

MANAGEMENT AREA F



Woodbine Map 3.20

Woodbine

West Rosebud

West Rosebud Map 3.21

3.2.5.3 MANAGEMENT AREA F: EAST ROSEBUD (2,010 Acres)(Map 3.22)

This management area is a long recreational corridor leading to developed campgrounds in the East Rosebud drainage.

Soils: About 400 acres (19 percent) of fragile soils are in this area. Most of the fragile soils are classified as such due to high to very high potential for water erosion, very high potential for offsite sediment transport, and low revegetation potential.

Vegetation: Vegetation communities are mostly lodgepole pine, bunchgrass/forb, and cottonwood. This management area has about 250 acres (12 percent of the management area) of riparian zones. There are isolated occurrences of spotted knapweed. *Gentianopsis simplex* (Hiker's Gentian), a sensitive species, is in this management area. This is one of three known occurrences of this species in the Northern Region. The population here is 200 air miles east of the nearest known population. There are 900 acres (44 percent) of suitable habitat for this species.

Moose: Extensive stands of aspen and shrub-dominated wetlands provide winter/spring habitat for the East Rosebud herd. There are about 500 acres (24 percent of the management area) of occupied moose seasonal home range within this area. Most of the winter/spring home range is located outside the decision area. During the summer and fall months, moose in this herd migrate up into the Absaroka-Beartooth Wilderness.

Aesthetics/Visuals: The existing visual condition is almost all slightly altered, with small portions being heavily altered.

Cultural Resources: Over 18 percent of this management area, or 420 acres, has a moderate site density.

Recreation and Access: Primary vehicle access into this management area is provided by East Rosebud Road 177, Sand Dune Road 177A, East Rosebud Campground Road 177B, and Jimmi Joe Campground Road 177D. There are 5.75 miles of road in this management area, producing a road density of 1.59 miles per square mile. Recreationists use this area for camping, hiking, and fishing. Hiking opportunities into the Absaroka-Beartooth Wilderness are provided by East Rosebud Trails 13, 15, and 17. Jimmi Joe and Emerald Campground provides public day-use picnic areas and overnight camping facilities.

Oil and Gas Potential: The entire management area has low oil and gas development potential.

3.2.5.4 MANAGEMENT AREA F: GRIZZLY PEAK (1,870 Acres)(Map 3.23)

Soils: There are approximately 1,340 acres (71 percent of the management area) with fragile soils in this area. Most of the fragile soils are classified as such due to high potential for wind erosion, very high potential for water erosion, very high potential for offsite sediment transport, and low revegetation potential.

Vegetation: The vegetation community is mostly lodgepole pine. About 30 acres (one percent) of this management area is comprised of riparian communities. There are isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. There are about 340 acres (18 percent of the area) of suitable habitat for *Shoshonea pulvinata*. Most of this habitat occurs where there is moderate potential for oil and gas occurrence and development.

Aesthetics/Visuals: The existing visual condition is approximately 50 percent natural appearing and 50 percent heavily altered.

Recreation and Access: Palisades Road 1479 is the primary vehicle access into this management area. Palisades Campground provides day-use picnic opportunities and overnight camping facilities. The Red Lodge Mountain downhill ski area is located in this unit and receives high winter recreation use.

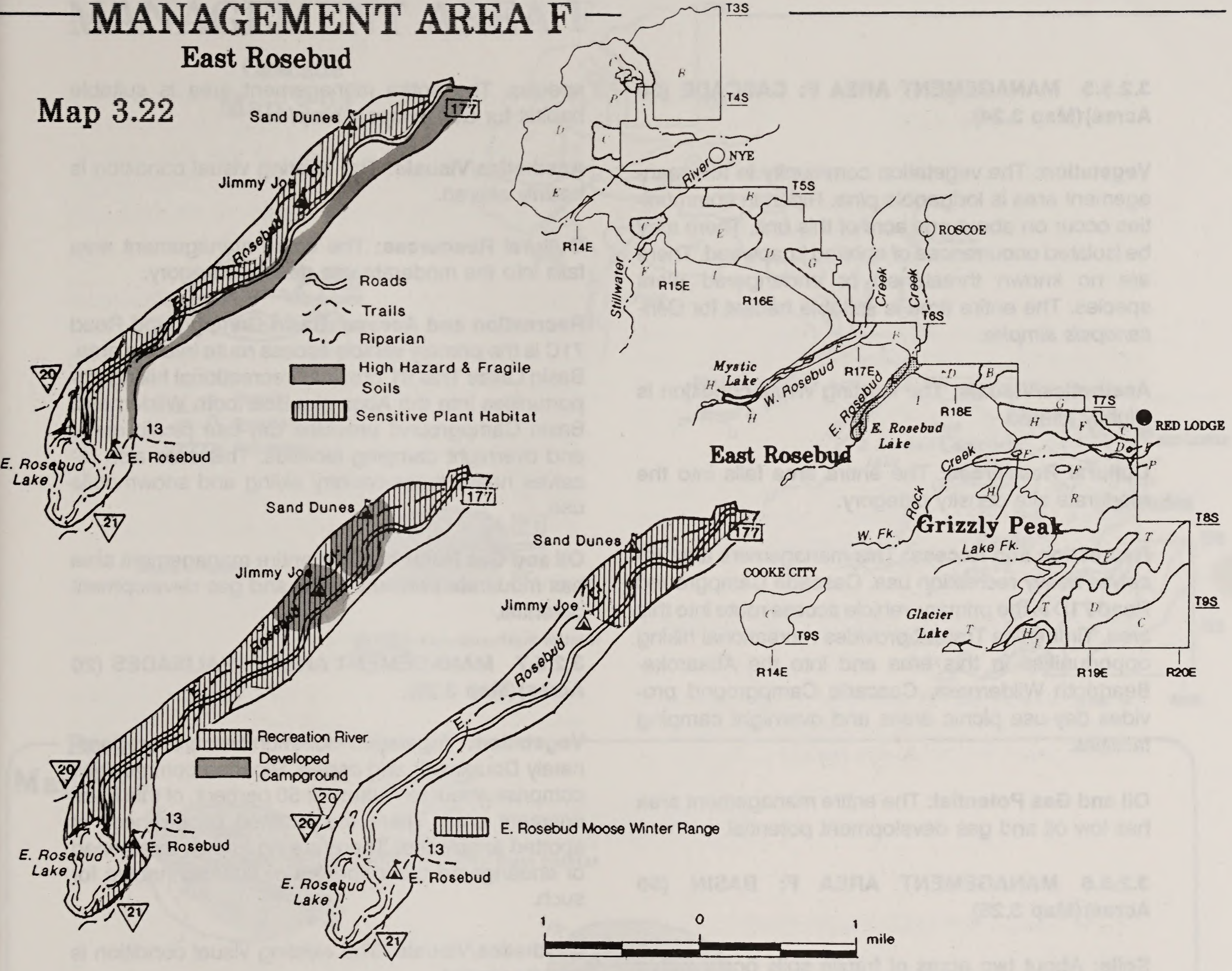
Roadless: There are 720 acres of the Burnt Mountain Roadless Area within this management area.

Oil and Gas Potential: There are 1,200 acres of moderate and 480 acres of low oil and gas development potential within this management area.

MANAGEMENT AREA F

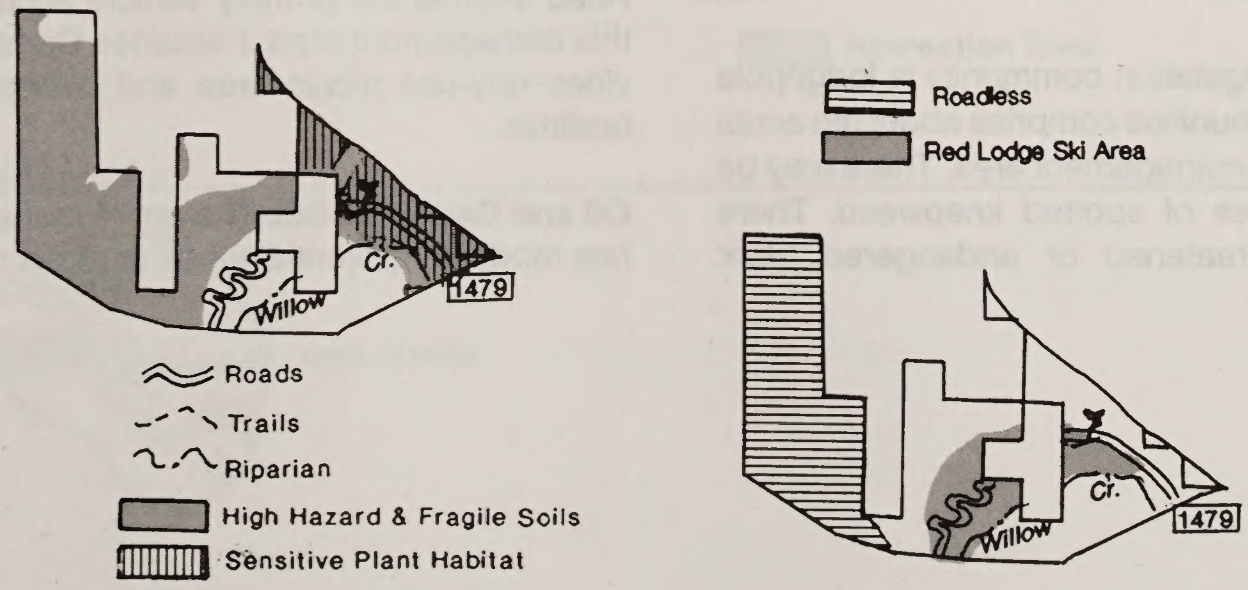
East Rosebud

Map 3.22



Grizzly Peak

Map 3.23



3.2.5.5 MANAGEMENT AREA F: CASCADE (30 Acres) (Map 3.24)

Vegetation: The vegetation community in this management area is lodgepole pine. Riparian communities occur on about one acre of this unit. There may be isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. The entire area is suitable habitat for *Gentianopsis simplex.*

Aesthetics/Visuals: The existing visual condition is slightly altered.

Cultural Resources: The entire area falls into the moderate site density category.

Recreation and Access: This management area receives heavy recreation use. Cascade Campground Road 71D is the primary vehicle access route into this area. Timberline Trail 12 provides recreational hiking opportunities in this area and into the Absaroka-Beartooth Wilderness. Cascade Campground provides day-use picnic areas and overnight camping facilities.

Oil and Gas Potential: The entire management area has low oil and gas development potential.

3.2.5.6 MANAGEMENT AREA F: BASIN (50 Acres) (Map 3.25)

Soils: About two acres of fragile soils occur within this area. Most of the fragile soils are classified as such due to high potential for water erosion and low revegetation potential.

Vegetation: The vegetation community is lodgepole pine. Riparian communities comprise about ten acres (20 percent) of this management area. There may be isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species. The entire management area is suitable habitat for *Gentianopsis simplex.*

Aesthetics/Visuals: The existing visual condition is heavily altered.

Cultural Resources: The entire management area falls into the moderate site density category.

Recreation and Access: Basin Campground Road 71C is the primary vehicle access route into the area. Basin Lakes Trail 61 provides recreational hiking opportunities into the Absaroka-Beartooth Wilderness. Basin Campground provides day-use picnic areas and overnight camping facilities. This area also receives heavy cross-country skiing and snowmobile use.

Oil and Gas Potential: The entire management area has moderate potential for oil and gas development potential.

3.2.5.7 MANAGEMENT AREA F: PALISADES (20 Acres) (Map 3.26)

Vegetation: Vegetation communities are predominately Douglas-fir and aspen. Riparian communities comprise about ten acres, or 50 percent, of this management area. There are isolated occurrences of spotted knapweed. There are no known threatened or endangered plant species or suitable habitat for such.

Aesthetics/Visuals: The existing visual condition is heavily altered.

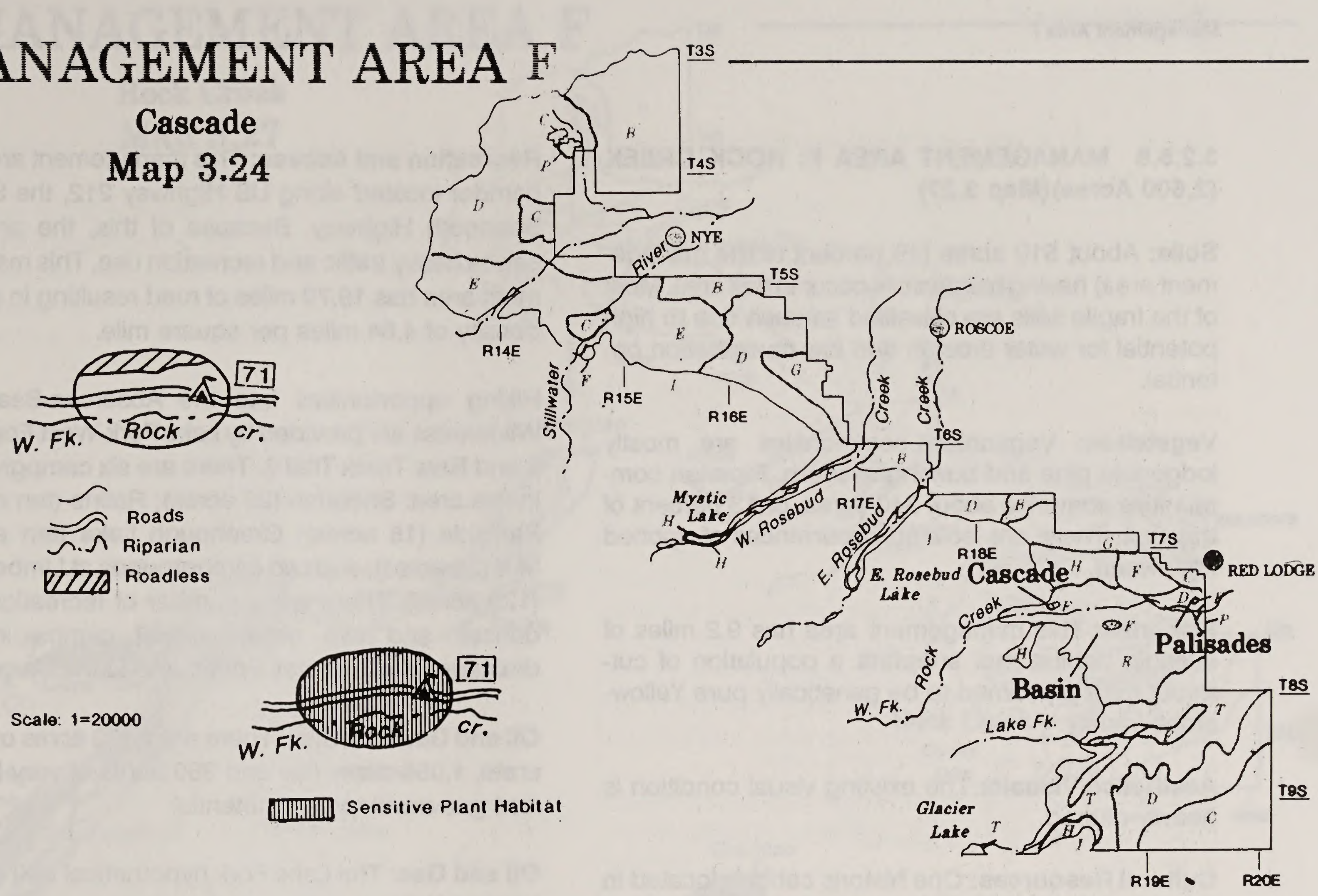
Recreation and Access: Palisades Campground Road 3010 is the primary vehicle access route into this management area. Palisades Campground provides day-use picnic area and overnight camping facilities.

Oil and Gas Potential: The entire management area has moderate potential for oil and gas development.

MANAGEMENT AREA F

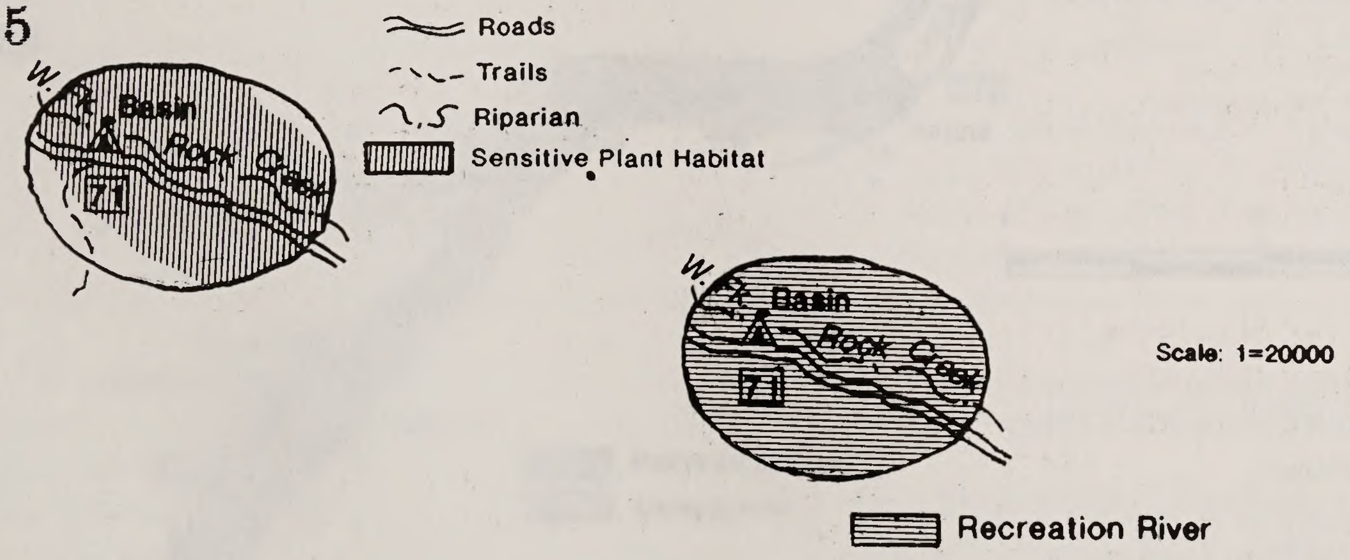
Cascade

Map 3.24



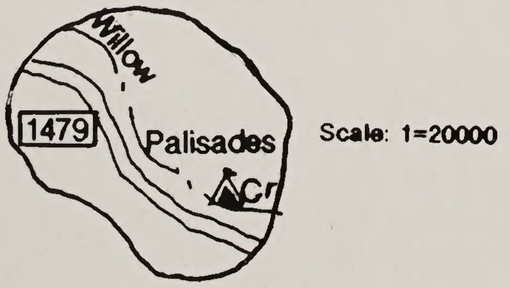
Basin

Map 3.25



Palisades

Map 3.26



3.2.5.8 MANAGEMENT AREA F: ROCK CREEK (2,600 Acres)(Map 3.27)

Soils: About 510 acres (19 percent of the management area) having fragile soils occur in this area. Most of the fragile soils are classified as such due to high potential for water erosion and low revegetation potential.

Vegetation: Vegetation communities are mostly lodgepole pine and bunchgrass/forb. Riparian communities comprise about 340 acres, or 13 percent of this unit. There are isolated occurrences of spotted knapweed.

Fisheries: This management area has 9.2 miles of suitable habitat that supports a population of cutthroat trout presumed to be genetically pure Yellowstone variety.

Aesthetics/Visuals: The existing visual condition is heavily altered.

Cultural Resources: One historic cabin is located in this management area. Approximately 560 acres of the unit have a moderate site density.

Recreation and Access: This management area is a corridor located along US Highway 212, the Scenic Beartooth Highway. Because of this, the area receives heavy traffic and recreation use. This management area has 19.70 miles of road resulting in a road density of 4.64 miles per square mile.

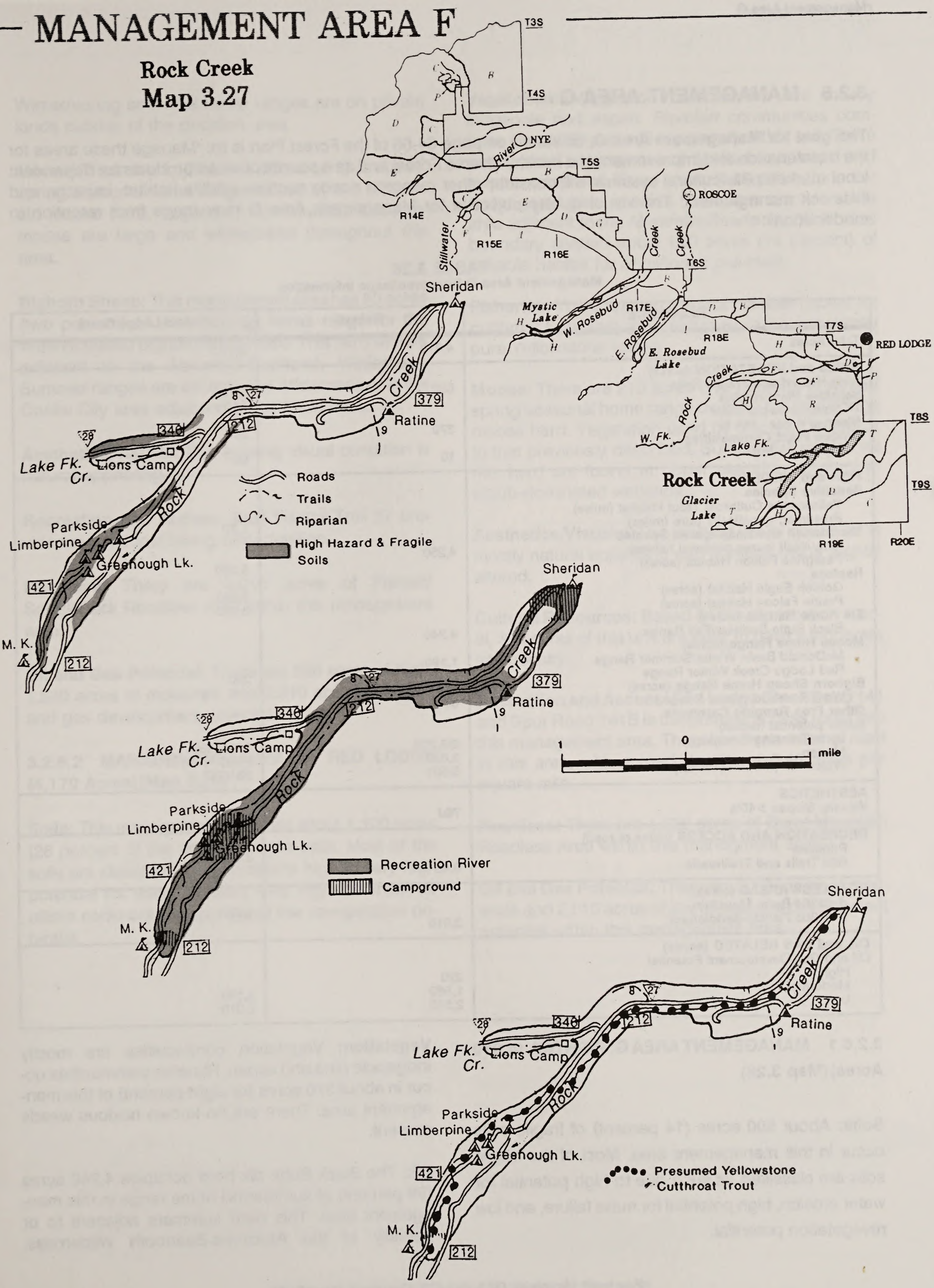
Hiking opportunities into the Absaroka-Beartooth Wilderness are provided by Lake Fork-West Fork Trail 1 and Bear Track Trail 8. There are six campgrounds in this area: Sheridan (20 acres); Ratine (ten acres); Parkside (15 acres); Greenough Lake (ten acres); M-K (20 acres); and two campgrounds at Limber Pine (120 acres). There are a number of recreation residences and two organizational camps in this drainage (Westminster Spires and Lions Camp).

Oil and Gas Potential: There are 1,170 acres of moderate, 1,050 acres low and 380 acres of very low oil and gas development potential.

Oil and Gas: The Lake Fork hypothetical well sites is located in this management area.

MANAGEMENT AREA F

Rock Creek
Map 3.27



3.2.6 MANAGEMENT AREA G

The goal for Management Area G; as stated on page 64-66 of the Forest Plan is to: "Manage these areas for the maintenance and improvement of a healthy diverse Forest and as a source of wood products for dependent local markets. Silvicultural systems will consider other resource needs such as wildlife habitat, impacts, and livestock management." The visual quality objective for Management Area G may range from retention to modification.

TABLE 3.26
Management Area G Resource/Issue Information

RESOURCE	Fishtail	Red Lodge Creek
Total Acres	4,310	4,170
SOILS and VEGETATION (acres)		
High Hazard and Fragile Soils	590	1,100
Sensitive Plant Habitat		510
Shoshonea pulvinata		
Riparian Areas - MA M	370	250
Unique Plant Communities		
Whitebark Pine	10	90
FISH and WILDLIFE		
Sensitive Species		
Yellowstone Cutthroat Trout Habitat (miles)		
Presumed genetically pure (miles)		1.70
Threatened and Endangered Species		
Gray Wolf (acres potential habitat)	4,250	
Peregrine Falcon Habitat (acres)		3,280
Raptors		
Golden Eagle Habitat (acres)		3,280
Prairie Falcon Habitat (acres)		3,280
Elk Home Ranges (acres)		
Black Butte Summer/Fall Range	4,240	
Moose Home Range (acres)		
McDonald Basin Winter/Summer Range	1,190	
Red Lodge Creek Winter Range		210
Bighorn Sheep Home Range (acres)		
West Rosebud Winter Range	80	
Other Free Ranging Carnivore (acres potential habitat)		
Lynx (Denning/Foraging)	0/3,700	140/2,930
Marten	3,630	2,990
Wolverine (Summer/Winter)	0/501	234/737
AESTHETICS		
Visuals; Slopes >40%	760	1,080
RECREATION AND ACCESS (miles of road)		
Primitive		3.00
RIM Trails and Trailheads	0.42	
ROADLESS AREAS (acres)		
# 01364 Burnt Mountain		1,620
# 01366 Fishtail-Saddleback	3,010	
OIL and GAS RELATED (acres)		
Oil and Gas Development Potential		
High	220	
Moderate	1,580	2,160
Low	2,510	2,010

3.2.6.1 MANAGEMENT AREA G: FISHTAIL (4,310 Acres) (Map 3.28)

Soils: About 590 acres (14 percent) of fragile soils occur in this management area. Most of the fragile soils are classified as such due to high potential for water erosion, high potential for mass failure, and low revegetation potential.

Vegetation: Vegetation communities are mostly lodgepole pine and aspen. Riparian communities occur in about 370 acres (or eight percent) of this management area. There are no known noxious weeds present.

Elk: The Black Butte elk herd occupies 4,240 acres (99 percent) of summer/fall home range in this management area. This herd summers adjacent to or partially in the Absaroka-Beartooth Wilderness.

Winter/spring seasonal home ranges are on private lands outside of the decision area.

Moose: There are 1,190 acres (28 percent) of winter/spring seasonal home range utilized by the McDonald moose herd. Vegetation communities used by moose are large and widespread throughout the area.

Bighorn Sheep: This management area has 80 acres (two percent) of winter/spring home range for the West Rosebud bighorn sheep herd. This herd winters adjacent to the Absaroka-Beartooth Wilderness. Summer ranges are either in the Wilderness or in the Cooke City area adjacent to the Wilderness.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Recreation and Access: East Fishtail Trail 37 provides recreational hiking opportunities.

Roadless: There are 3,010 acres of Fishtail/Saddleback Roadless Area within this management area.

Oil and Gas Potential: There are 220 acres of high, 1,580 acres of moderate and 2,510 acres of low oil and gas development potential.

3.2.6.2 MANAGEMENT AREA G: RED LODGE (4,170 Acres)(Map 3.29)

Soils: This management area has about 1,100 acres (26 percent of the area) of fragile soils. Most of the soils are classified as such due to high to very high potential for water erosion, very high potential for offsite sediment transport, and low revegetation potential.

Vegetation: Vegetation communities are mostly lodgepole and aspen. Riparian communities comprise about 250 acres (five percent) of this unit. There are isolated occurrences of spotted knapweed and sulphur cinquefoil. There are no known threatened or endangered plant species. The upper reaches of the area adjacent to the Absaroka-Beartooth Wilderness boundary contain about 600 acres (14 percent) of suitable habitat for *Shoshonea pulvinata*.

Fisheries: There are two miles of suitable habitat for cutthroat trout that are presumed to be genetically pure Yellowstone variety.

Moose: There are 210 acres (five percent) of winter/spring seasonal home range used by the Red Lodge moose herd. Vegetation used by this herd is similar to that previously described. Summer/fall ranges for this herd are found at upper elevation aspen and shrub-dominated wetlands.

Aesthetics/Visuals: The existing visual condition is mostly natural appearing with portions being slightly altered.

Cultural Resources: Based on the site location model, 390 acres of this unit are likely to have a moderate site density.

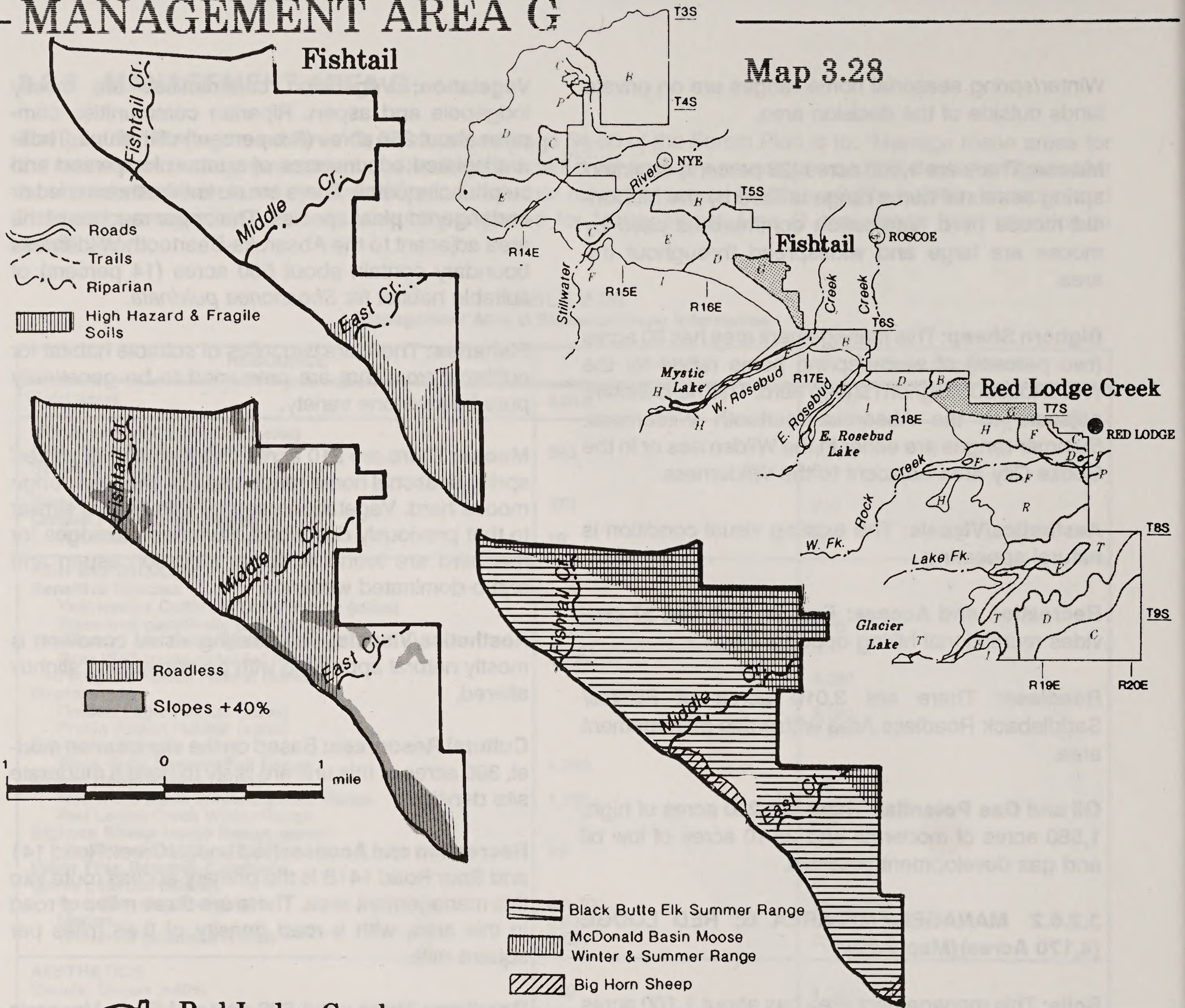
Recreation and Access: Red Lodge Creek Road 141 and Spur Road 141B is the primary access route into this management area. There are three miles of road in this area, with a road density of 0.46 miles per square mile.

Roadless: There are 1,620 acres of Burnt Mountain Roadless Area within this managment area.

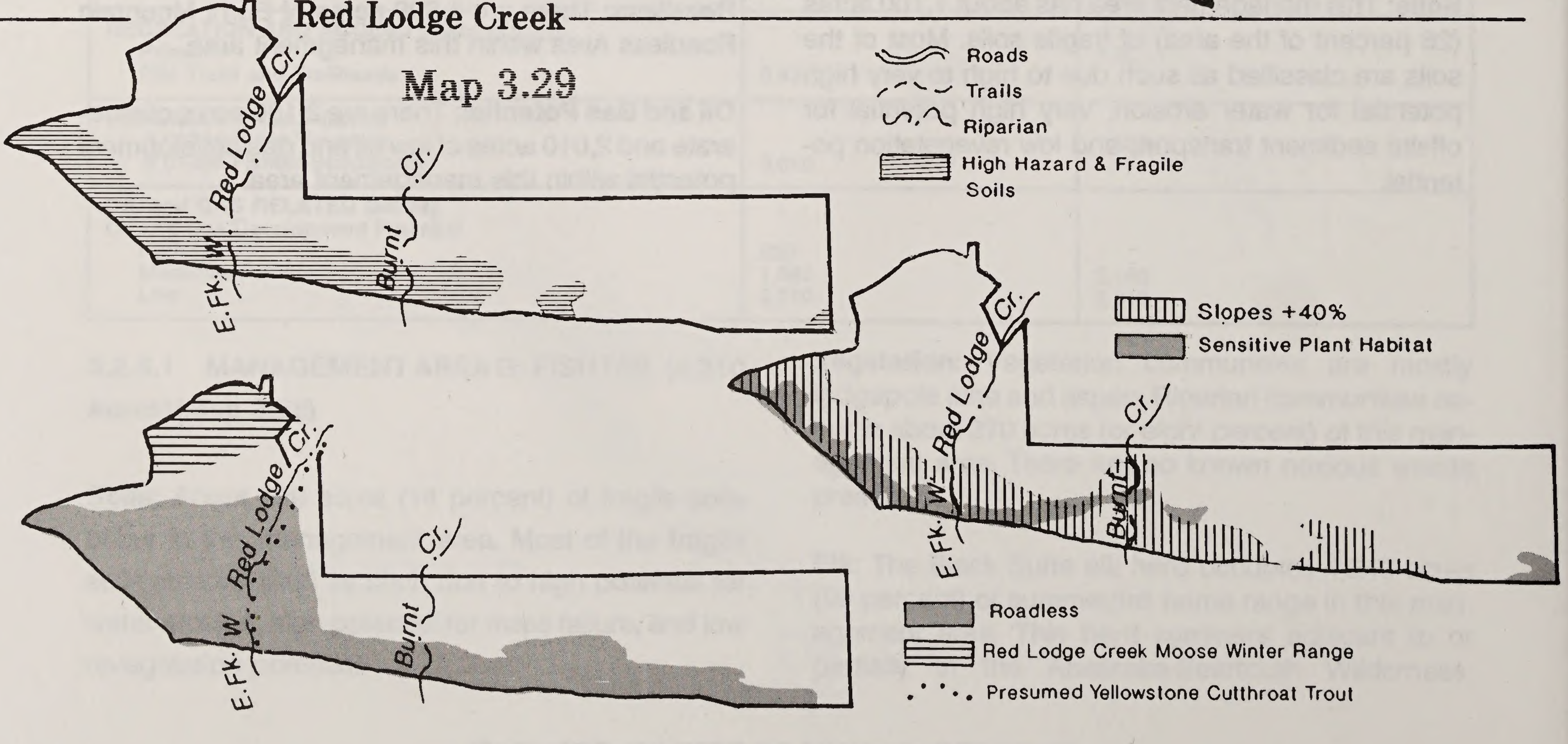
Oil and Gas Potential: There are 2,160 acres of moderate and 2,010 acres of low oil and gas development potential within this management area.

MANAGEMENT AREA G

Map 3.28



Map 3.29



3.2.7 MANAGEMENT AREA P

The goal for Management Area P; as stated on page 88 of the Forest Plan is to: "Provide adequate facilities for Forest administration."

The visual quality objective for Management Area P may range from retention to modification.

TABLE 3.27
Management Area P Resource/Issue Information

RESOURCE	Meyers Creek	Rock Creek
Total Acres	280	80
SOILS and VEGETATION		
Sensitive Plant Habitat		
Gentianopsis simplex		60
Riparian Areas - MA M	20	10
Unique Plant Communities		
Whitebark Pine	460	
FISH and WILDLIFE (acres)		
Threatened and Endangered Species		
Gray Wolf (potential habitat)	320	
Bald Eagle (potential habitat)		50
Peregrine Falcon (potential habitat)	320	20
Prairie Falcons	320	
Raptors (acres)		
Golden Eagle Habitat		70
Elk Home Ranges (acres)		
Meyers Creek Winter/Spring Range	250	
RECREATION AND ACCESS (miles)		
Primitive	1.20	
Aggregate		0.58
Proposed Recreational Rivers ??		
West Fork of Rock Creek		
CULTURAL RESOURCES (# of sites)		
Cultural Sites	1	1
OIL and GAS RELATED (acres)		
Oil and Gas Development Potential		
Moderate		80
Low	280	

3.2.7.1 MANAGEMENT AREA P: MEYERS CREEK (280 Acres)(Map 3.30)

Soils: Less than ten acres of fragile soils occur within this area. Most of the fragile soils are classified as such due to very high potential for water erosion and very high potential for offsite sediment transport.

Vegetation: Vegetation communities are mostly whitebark pine and bunchgrass/forb. Riparian communities comprise about 20 acres (seven percent) of this unit. Spotted knapweed and sulfur cenquefoil occur in this area. There are no known threatened or endangered plant species.

Elk: This management area has 250 acres (89 percent of the management area) of winter/spring home range which is used by the Meyers Creek elk herd. This portion of it is used only after the close of the big game hunting season.

Aesthetics/Visuals: The existing visual condition is natural appearing.

Cultural Resources: Meyers Creek Ranger Station is located in this management area. Thirty acres of the area is likely to have a high site density.

Recreation and Access: Meyers Creek Spur Road 143A is the primary access route into this management area. There are approximately 1.20 miles of road in this area producing a road density of 2.40 miles/sq. mile.

Oil and Gas Potential: The entire management area has low oil and gas development potential.

3.2.7.2 MANAGEMENT AREA P: ROCK CREEK (80 Acres)(Map 3.31)

Vegetation: The predominate vegetation community is bunchgrass/forb. Riparian communities comprise about ten acres (12 percent) of the unit. Spotted knapweed occurs in this area. There are no known threatened or endangered plant species. This area has approximately 60 acres (75 percent of the area) of suitable habitat for *Gentianopsis simplex*.

Aesthetics/Visuals: The existing visual condition is heavily altered.

Cultural Resources: Rock Creek Ranger Station is located in this management area. The entire area is considered to have a moderate site density.

Recreation and Access: Palisades Road 3010 is the primary access route into this management area. There is 0.58 miles of road in this area with a road density of 5.30 miles per square mile.

Oil and Gas Potential: The entire management area has moderate oil and gas development potential.

3.2.8 MANAGEMENT AREA R

The goal for Management Area R; as stated on page 91-93 of the Forest Plan is to: "Protect and maintain high quality water for public domestic use."

The visual quality objective for Management Area R may range from retention to partial retention.

TABLE 3.28

Management Area R Resource/Issue Information

RESOURCE	West Fork of Rock Creek
Total Acres	18,030
SOILS and VEGETATION (acres)	
High Hazard and Fragile Soils	8,370
Sensitive Plant Habitat	
Gentianopsis simplex	1,730
Shoshonea pulvinata	200
Alpine species	210
Riparian Areas - MA M	970
Unique Plant Communities	
Wet/Dry Alpine	340
Mountain Meadows	20
Whitebark Pine	2,910
FISH and WILDLIFE (acres)	
Sensitive Species	
Bats (potential habitat)	50
Threatened and Endangered Species	
Gray Wolf	19,040
Bald Eagle Habitat (acres)	990
Peregrine Falcon Habitat (acres)	2,150
Raptors	
Golden Eagle Habitat (acres)	3,140
Prairie Falcon Habitat (acres)	3,140
Elk Home Ranges	
Silver Run Summer/Fall Range	180
Hellroaring/Silver Run Winter/Spring Range	740
Other Free Ranging Carnivore	
Lynx (Denning/Foraging potential habitat)	570/11,550
Marten (potential habitat)	11,470
Wolverine (Summer/Winter potential habitat)	3,850/0

RESOURCE	West Fork of Rock Creek
RECREATION AND ACCESS	
Miles of Road	
Primitive	4.00
Aggregate	6.10
Paved	4.60
Wild Bill Picnic Area	30
Recreation Residences and Organizational Camps	50
RIM Trails and Trailheads	18.02
CULTURAL RESOURCES	
Cultural Sites	4
ROADLESS AREAS (acres)	
# 01363 Timberline	10,190
# 01364 Burnt Mountain	4,380
QUALITY OF WATER (acres)	
Slopes over 30%	16,260
OIL and GAS RELATED (acres)	
Oil and Gas Development Potential	
Moderate	7,550
Low	10,480
Well Sites	1

3.2.8.1 MANAGEMENT AREA R: WEST FORK ROCK CREEK (18,030 Acres)(Map 3.32)

Soils: About 8,370 acres (46 percent of the management area) have fragile soils in this area. Most of the fragile soils are are so classified due to high to very high potential for water erosion, high potential for wind erosion, very high potential for offsite sediment transport, and low revegetation potential.

Water Quality: This management area provides the water supply for the town of Red Lodge. Water wells draw water from an aquifer along the West Fork of Rock Creek a short distance downstream of the Forest boundary. The State of Montana has classified the West Fork of Rock Creek as A1. This classification allows fewer coliform bacteria and smaller increases in turbidity and color to be generated by land management activities than other classifications would allow. Giardia is present in the West Fork of Rock Creek.

Vegetation: Vegetation communities are mostly lodgepole pine, Douglas-fir, and limber pine. Upper elevations also have Engelmann spruce and whitebark pine. Dry alpine meadows occur on approximately 340 acres (two percent of the management area). Riparian communities comprise about 970 acres (five percent) of this area. Spotted knapweed occurs on this area. There are no known threatened or endangered plant species. This area contains about 210 acres (one percent) of suitable habitat for alpine plant species of special concern; 1,730 acres (ten percent) of suitable habitat for *Gentianopsis simplex*; and 200 acres (one percent) of suitable habitat for *Shoshonea pulvinata*.

Elk: This area is used by two elk herds. The 740-acre (four percent of the management area) winter/spring range used by the Hellroaring and Silver Run elk herds is an important part of their home range. Elk use on this range is split evenly between private and public lands. This area lies adjacent to the recently purchased Point of Rocks Wildlife Management Area.

A portion (180 acres, or one percent) of this area is adjacent to the Absaroka-Beartooth Wilderness and is summer/fall core home range for the Silver Run elk herd. The balance of this seasonal core home range is in the Wilderness.

Aesthetics/Visuals: The existing visual condition is almost all natural appearing; a small part is heavily modified.

Cultural Resources: Four historic sites have been identified in this management area, including the Camp Senia Historic District. Approximately 230 acres of the unit falls in the high site density category and 1,050 acres fall into the moderate site density category.

Recreation and Access: This area receives heavy recreational use. Primary access routes into this management area are West Fork of Rock Creek Road 71, Rock Creek Road 71A, Timbercrest Road 71B, Wild Bill Road 71F, Silver Run Road 1476, and Nichols Creek Road 1478. The area has 14.70 miles of road, resulting in a road density of 0.49 miles per square mile.

Hiking opportunities into the management area and the Wilderness are provided by Bear Track Trail 8, Timberline Trail 12, Ingles Creek Trail 35, and Silver Run Trail 51. The Silver Run Ski Loop 102 is also within this area. This cross-country loop is extensively used when conditions warrant. It is also used in the summer by mountain bikers. Public day-use picnic areas and overnight camping facilities include Wild Bill Picnic Area, Basin, and Cascade Campgrounds. Camp Timbercrest, an organizational camp, and a number of recreational residences are also in this management area.

Roadless: There are 10,190 acres of Timberline and 4,380 acres of Burnt Mountain Roadless Areas within this management area.

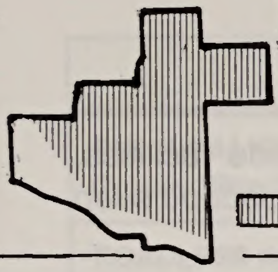
Oil and Gas Potential: There are 7,550 acres of moderate and 10,480 acres of low oil and gas development potential within this management area.

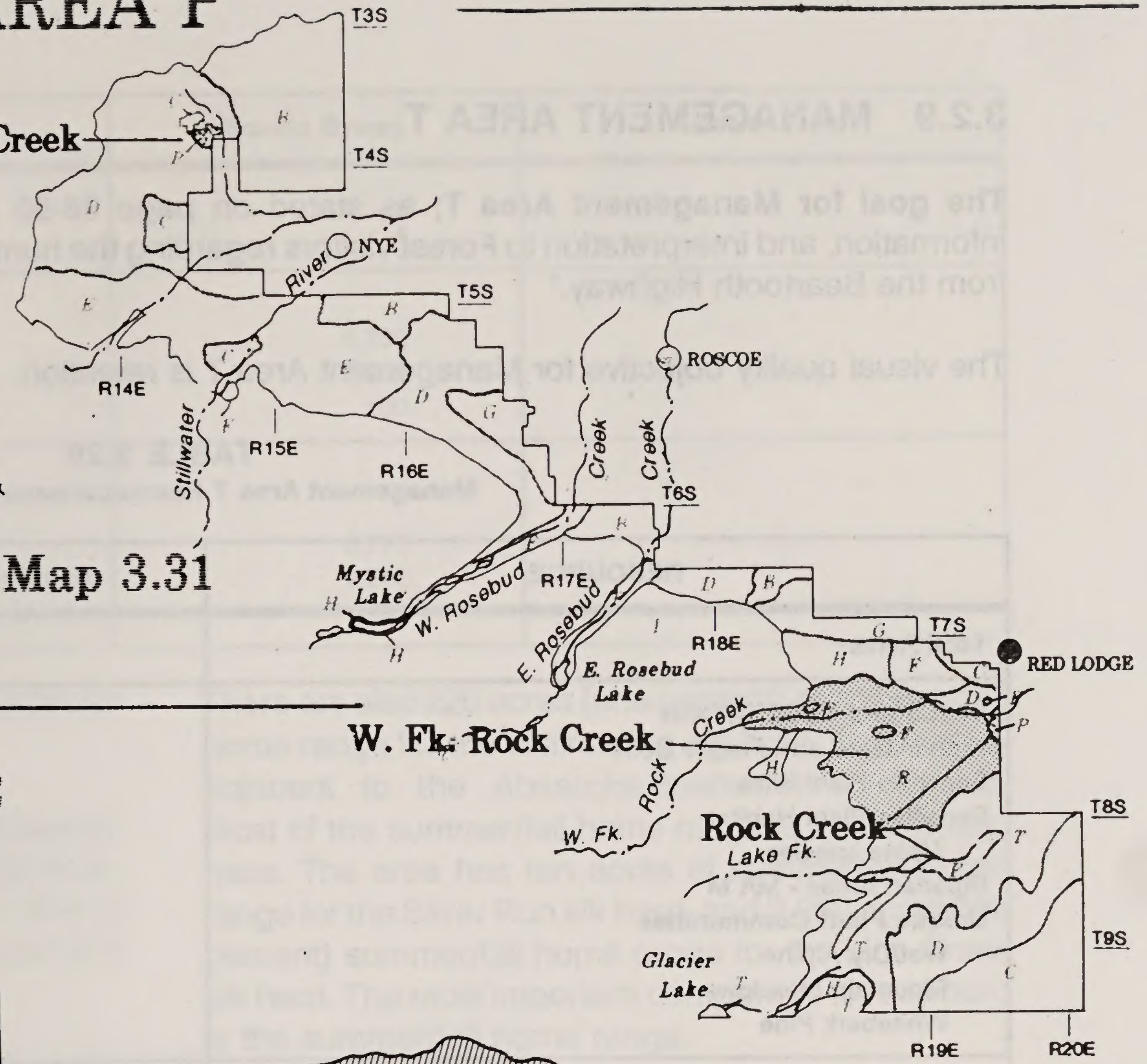
Oil and Gas: The Silver Run hypothetical well site is located within this area.

MANAGEMENT AREA P

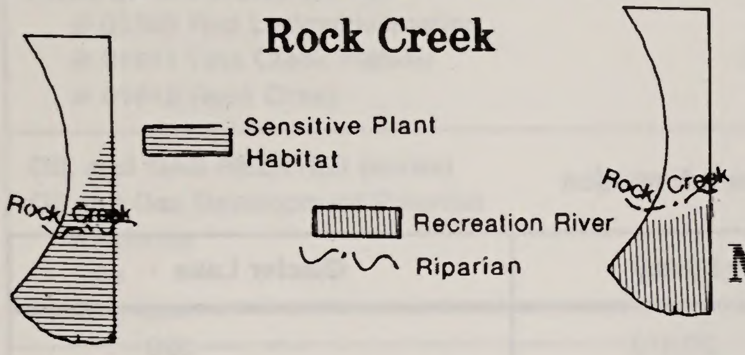
Meyers Creek

Map 3.30





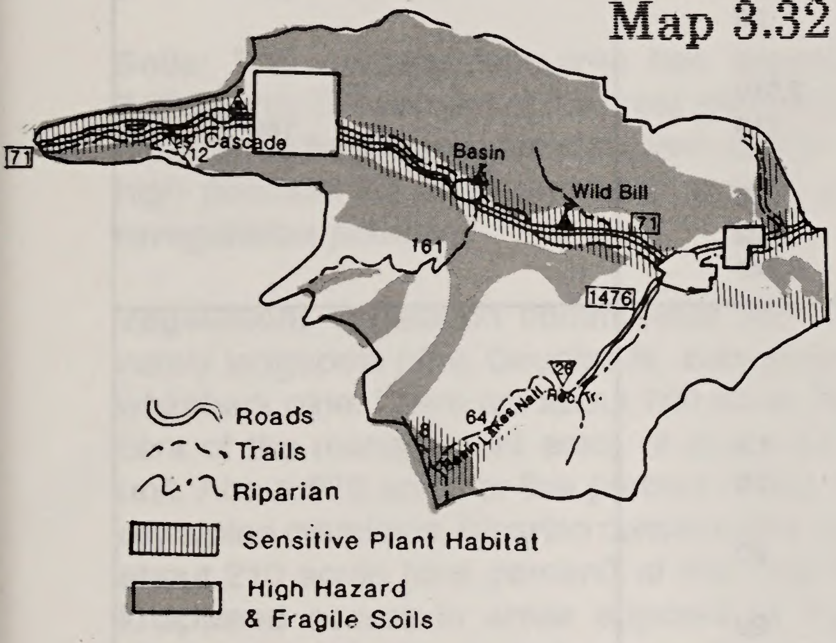
Rock Creek

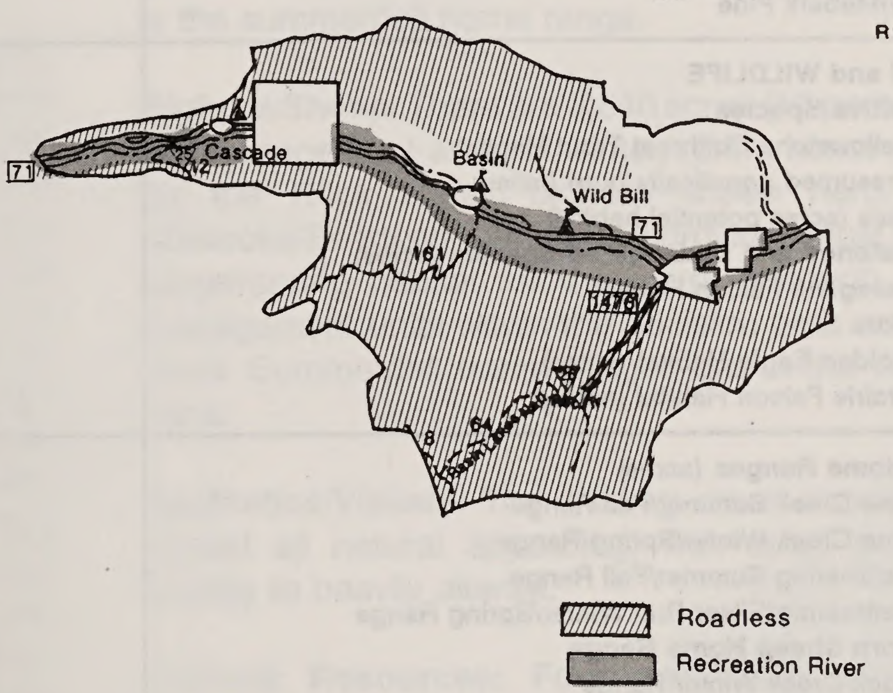


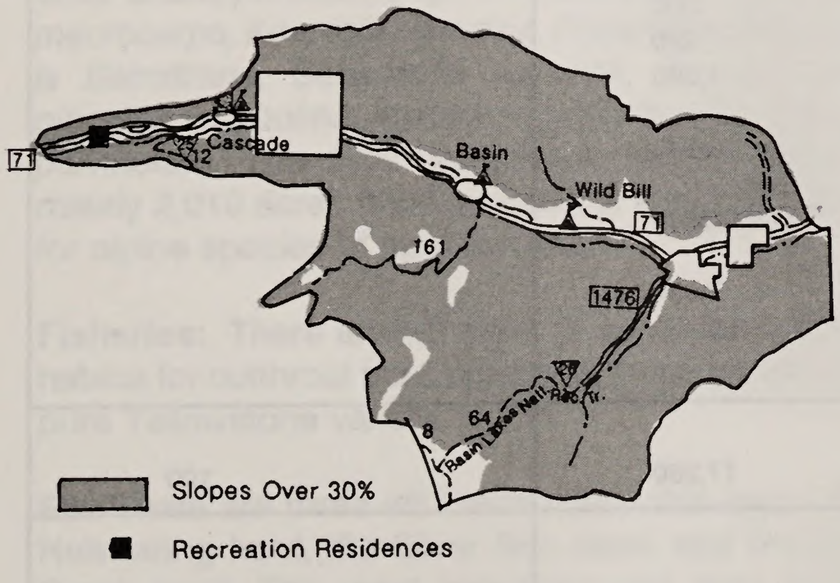
Map 3.31

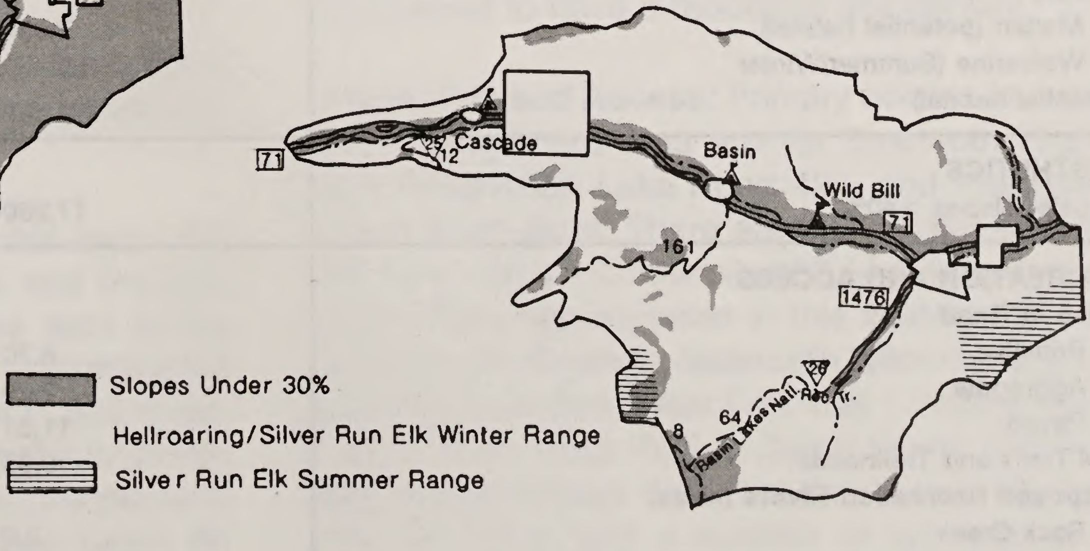
W. Fk. Rock Creek R

Map 3.32








71
Cascade
212
Basin
Wild Bill
71
161
1476
64
8
Basin Lakes Nat'l Rec. Tr.
Slopes Under 30%
Hellroaring/Silver Run Elk Winter Range
Silver Run Elk Summer Range

3.2.9 MANAGEMENT AREA T

The goal for Management Area T; as stated on page 98-99 of the Forest Plan is to: "Provide facilities, information, and interpretation to Forest visitors regarding the human and natural history of the landscape seen from the Beartooth Highway."

The visual quality objective for Management Area T is retention.

TABLE 3.29
Management Area T Resource/Issue Information

RESOURCE	Scenic Byway	Glacier Lake
Total Acres	20,410	320
SOILS and VEGETATION		
High Hazard and Fragile Soils	7,730	320
Sensitive Plant Sites	20	
Sensitive Plant Habitat		
Alpine species	2,010	
Riparian Areas - MA M	210	180
Unique Plant Communities		
Wet/Dry Alpine	975	
Mountain Meadows	22	
Whitebark Pine	2,340	
FISH and WILDLIFE		
Sensitive Species		
Yellowstone Cutthroat Trout Habitat		
Presumed genetically pure (miles)	4.3	
Bats (acres potential habitat)	50	
Threatened and Endangered Species (acres)		
Peregrine Falcon Habitat	20	
Raptors		
Golden Eagle Habitat (acres)	20	
Prairie Falcon Habitat (acres)	20	
Elk Home Ranges (acres)		
Line Creek Summer/Fall Range	2,050	
Line Creek Winter/Spring Range	200	
Hellroaring Summer/Fall Range	220	
Hellroaring/Silver Run Winter/Spring Range	1,500	
Bighorn Sheep Home Range		
Rock Creek Winter Range	3,540	
Other Free Ranging Carnivore		
Lynx (Denning/Foraging potential habitat)	1350/5500	
Marten (potential habitat)	7,690	
Wolverine (Summer/Winter potential habitat)	3,510/0	
AESTHETICS		
Visuals; Slopes >40%	17,260	100
RECREATION AND ACCESS		
Miles of Road		
Primitive	6.70	
Aggregate	2.20	
Paved	11.81	
RIM Trails and Trailheads	10.35	1.80
Proposed Recreation Rivers (miles)		
Rock Creek	2.0	
Lake Fork of Rock Creek	0.5	

RESOURCE	Scenic Byway	Glacier Lake
CULTURAL RESOURCES		
Cultural Sites (Number)	4	
ROADLESS AREAS (acres)		
# 01363 Red Lodge/Hellroaring	5,790	
# 01911 Line Creek Plateau	8,800	
# 01913 Rock Creek	100	
OIL and GAS RELATED (acres)		
Oil and Gas Development Potential		
Moderate	5,770	
Low	9,240	
Very Low	5,400	320

3.2.9.1 MANAGEMENT AREA T: SCENIC BYWAY (20,410 Acres)(Map 3.33)

Soils: This management area has approximately 7,730 acres (37 percent of the area) with fragile soils. Most of the fragile soils are classified as such due to high potential for water and wind erosion, and low revegetation potential.

Vegetation: Vegetation communities are predominately lodgepole pine, Douglas-fir, subalpine fir, and whitebark pine. There are about 760 acres (four percent of the management area) of alpine turf in this unit. About 975 acres or five percent of this unit has dry alpine meadows. Riparian communities comprise about 210 acres (one percent) of this unit. Spotted knapweed occurs in areas adjacent to this area. There are no threatened or endangered plant species. The following species of special concern occur in the southern portion of this management area: *Draba porsildii*, *Erigeron flabellifolius*, *Kobresia macrocarpa*, *Koenigia islandica*, *Phippsia algida*, *Salix Barrattiana*, *Selaginella watsonii*, *Senecio amplectens* var. *holmii*, *Stellaria crassifolia*, and *Thalspi parviflorum*. This area contains a total of approximately 2,010 acres (nine percent) of suitable habitat for alpine species of special concern.

Fisheries: There are 4.3 miles of occupied suitable habitat for cutthroat trout presumed to be genetically pure Yellowstone variety.

Elk: There are three elk herds within this area - the Hellroaring herd, the Silver Run herd, and the Line Creek herd. The most important use area is the Hellroaring/Silver Run herds' core winter/spring range. Most of the winter/spring range (1,500 acres, or eight percent of the management area) is on public land. Also, the area contains 200 acres (one percent) of winter/spring home range for the Line Creek elk herd. There are also 220 acres (one percent) of summer/fall home range for the Hellroaring elk herd. This area is adjacent to the Absaroka-Beartooth Wilderness. Most of the summer/fall home range is in the wilderness. The area has ten acres of summer/fall home range for the Silver Run elk herd, and 2,050 acres (ten percent) summer/fall home range for the Line Creek elk herd. The most important component for this herd is the summer/fall home range.

Bighorn Sheep: There are 3,540 acres (17 percent of the management area) of winter/spring home range for the Rock Creek bighorn sheep herd. The Absaroka-Beartooth Wilderness provides most of the winter/spring habitat for this herd, although other management units within the decision area are also used. Summer/fall home ranges are in the Wilderness.

Aesthetics/Visuals: The existing visual condition is almost all natural appearing, with small portions slightly to heavily altered.

Cultural Resources: Four prehistoric sites are recorded for this management area. Fifty acres are likely to have a high site density and forth acres are considered to have a moderate site density.

Recreation and Access: Primary access routes into this management area are via Beartooth Highway 212, Greenough Lake Road 421, and Hell Roaring Creek Road 3004. There are 20.71 miles of road in this area with a road density of 0.64 miles per square mile. Hiking opportunities in this management area and into the Absaroka-Beartooth Wilderness are provided by Lake Fork/West Fork Trail 1, Mount Maurice Trail 6, Bear Track Trail 8, Corral Creek Trail 9, and Hellroaring Plateau Trail 11. Lions Camp, an organizational camp, and a number of recreational residences are in this area.

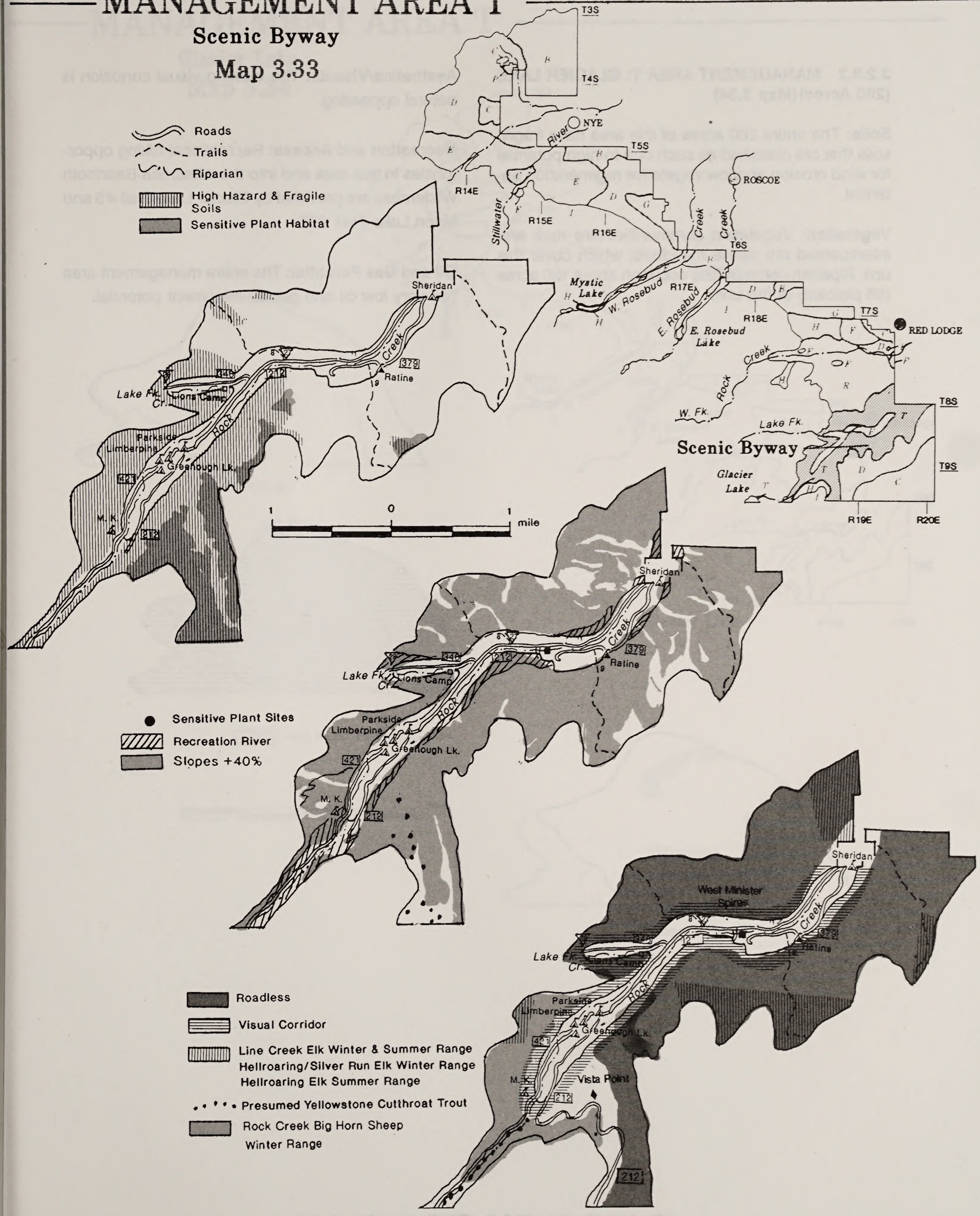
Roadless: There are three roadless areas within this management area. These roadless area are Red Lodge/Hellroaring (5,790), Line Creek Plateau (8,800), and Rock Creek (100).

Oil and Gas Potential: There are 5,770 acres of moderate, 9,240 acres of low and 5,400 acres of very low oil and gas development potential.

MANAGEMENT AREA T

Scenic Byway

Map 3.33



3.2.9.2 MANAGEMENT AREA T: GLACIER LAKE (280 Acres)(Map 3.34)

Soils: The entire 280 acres of this area have fragile soils that are classified as such due to high potential for wind erosion and low vegetative regeneration potential.

Vegetation: Vegetation communities are rock and interspersed dry alpine meadows, which cover this unit. Riparian communities occur on about 180 acres (56 percent) of the unit.

Aesthetics/Visuals: The existing visual condition is natural appearing.

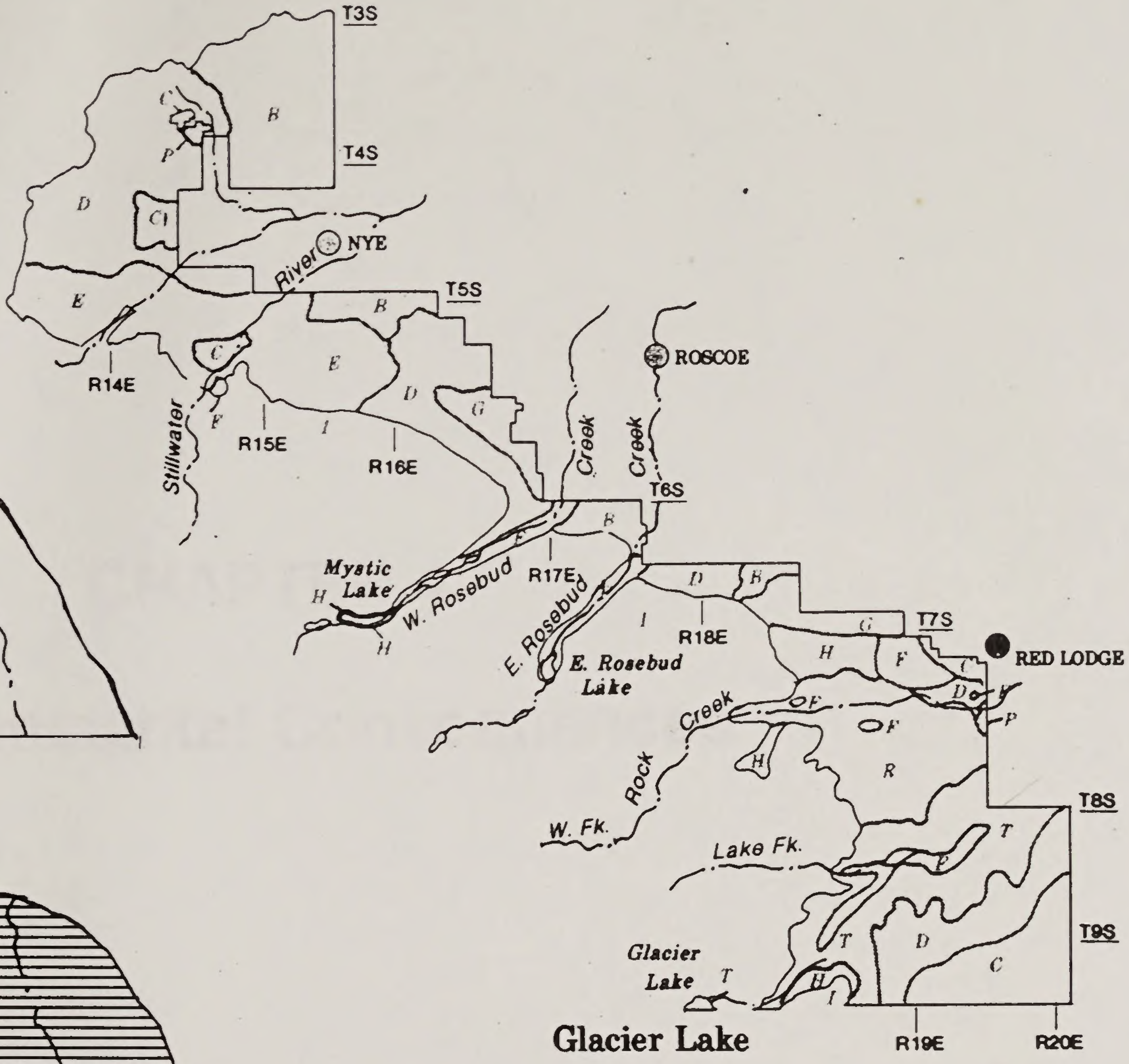
Recreation and Access: Recreational hiking opportunities in this area and into the Absaroka-Beartooth Wilderness are provided by Glacier Lake Trail #3 and Moon Lake Trail #66.

Oil and Gas Potential: The entire management area has very low oil and gas development potential.

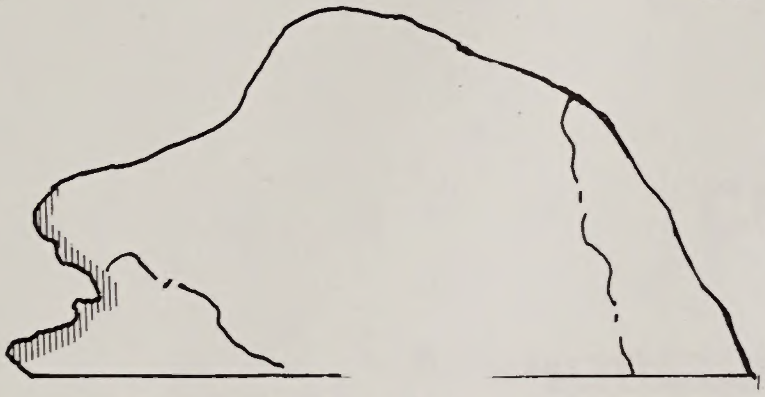
MANAGEMENT AREA T

Glacier Lake

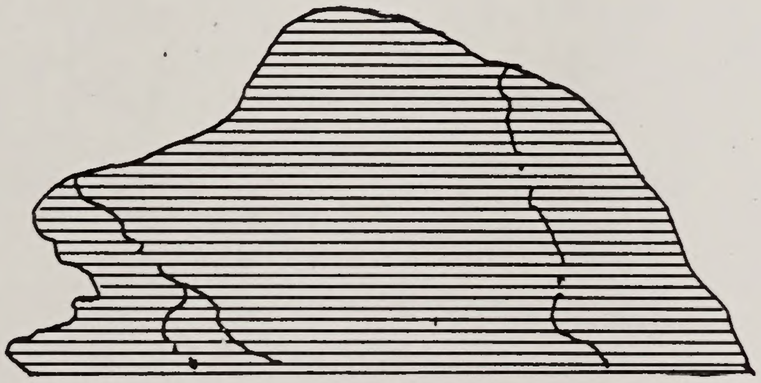
Map 3.34



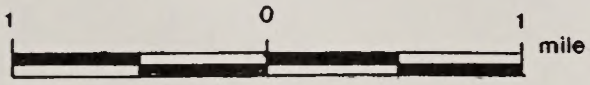
Glacier Lake

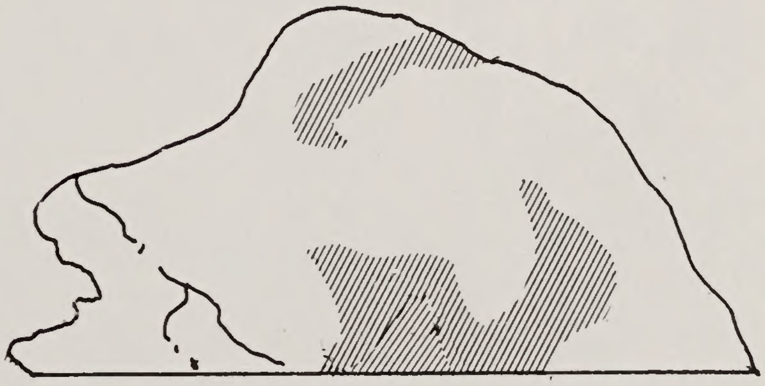


▨ Riparian



▤ High Hazard & Fragile Soils





▨ Slopes 40%

CHAPTER 4

Environmental Consequences

CHAPTER 4

4.0 INTRODUCTION

Chapter 4 discloses the potential environmental effects and consequences that could result from implementation of the alternatives considered. The environmental effects focus on the lands in the decision area and, in some cases, on surrounding lands.

This chapter is organized the same as chapter 3. Project wide effects are discussed (section 4.1), and then effects specific to the 31 management areas are discussed (sec. 4.2). In both sections the resources are discussed in the same order as issues are addressed in chapter 2. Effects and consequences can be described or grouped as follows:

- **Direct and Indirect Effects:** Direct effects are caused by the action occurring at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

- **Cumulative Effects:** Cumulative effects result from incremental change over time where the action is added to other past, present, and reasonably foreseeable future actions (regardless of what agency or person undertakes such other actions).

- **Possible Conflicts With Plans And Policies Of Other Jurisdictions:** Possible conflicts may be present between the proposed action and the objectives of Federal, state, and local land use plans and policies.

- **Probable Environmental Effects That Cannot Be Avoided:** The act of leasing does not cause impacts. On the other hand, the consequence of leasing is that ground-disturbing activities associated with oil and gas exploration and production may occur. However, before these activities can be authorized, further environmental analysis would be conducted. It is this latter analysis that will identify environmental effects that cannot be avoided.

- **The Relationship Between Short-term Use And Long-term Use:** In the context of the proposed action, short-term use would be associated with exploration and long-term use with production.

- **Irreversible And Irretrievable Commitments Of Resources:** An irreversible commitment describes a loss of future options. Some resources such as minerals may not be renewable even over very long periods of time.

  An irretrievable commitment of resources can be viewed as the loss of production or use of some natural resources, such as the minerals, because of allocation to another resource. They are irretrievable in that they are lost through the duration of conflicting use.

- **Consistency With The Forest Plan:** This refers to the degree to which the implementation of an alternative conforms or conflicts with Forest Plan direction.

Analysis Methodology

The methodology used to analyze each alternative was based primarily on the most current mapped resource information for the various resources that may be affected. The map information for each resource was initially entered into a geographic information system (GIS).

The base data was then converted to cell format which permits the integration of multiple resource base data information and the reclassification of this information for use in the alternative analysis. For this process, a cell size of 10 acres was assigned which essentially rounded off the base data acres to the nearest 10 acres. In addition, only resource acres on Federal lands within the decision area were converted since these lands were the only ones which are stipulated against.

The resource effects by alternative were analyzed both relationally and comprehensively, and a summary of the effects by alternative by resource was generated and displayed. A description of each resource map and the GIS methods used to develop the computer generated maps and related databases is contained in Appendix F and the planning file.

General and Site-Specific Consequences

At the decision area level, potential consequences associated with oil and gas exploration, development, and production activities are discussed without reference to any particular location. This is in recognition that activity can occur on any location of a particular lease unless, by stipulation, that activity is controlled or precluded (see Appendix E). This disclosure will provide the justification for the use of various mitigation measures which are implemented as lease stipulations. Since the use of stipulations also has potential effects on oil and gas exploration and development activities, that effect will be analyzed and disclosed as well.

To test the site-specific effectiveness of the mitigation measures and to provide a basis for addressing cumulative effects, four well sites have been identified through the Reasonably Foreseeable Development (RFD) analysis. Even though the location of these well sites is highly speculative, the environmental consequences expected at these locations is considered to be representative of the effects across the area as a whole and/or at locations with similar characteristics. Taken together, these well sites also provide the basis for measuring the cumulative effects that may result from reasonably foreseeable activity under the various alternatives. This level of analysis provides additional site-specific support for the specific lands decision. Appendix B provides information regarding the location, resources, quality of life considerations, and the expected oil and gas exploration and development activities at these four sites.

Due to the nature of an alternative, it might not be possible to actually drill or produce a well at some or all of the well sites. In the use of this analytical approach, rather than finding alternative locations, it is assumed that if a particular well site can not be utilized, the lessee/operator would then place their exploration investment at a location outside the decision area. This eliminates the need for open ended speculation about possible alternative drill sites.

Mitigation

Measures to mitigate adverse environmental effects of oil and gas exploration, development, and production activities are developed at two points in the process: at the time of leasing, and if and when an application for permit to drill (APD) is received and processed.

One of the main purposes of this analysis and disclosure is to identify those mitigation measures which will be attached as a stipulation or stipulations to an oil and gas lease. This Chapter and Appendix E contain details regarding the assignment and application of lease stipulations.

The second opportunity to apply mitigation is at the time an operating permit is approved. These mitigation measures, Conditions of Approval (COA), are applied at the time the Application for Permit to Drill (APD) is reviewed. That review normally includes a visit to the proposed well site followed by the preparation of a NEPA document that analyzes the potential environmental affects of oil and gas exploration and production activities at that specific location. Appendix D contains a list of the various COA's currently considered for use on the Beartooth Ranger District, and a discussion regarding application of the various COA's and rationale for their use.

Monitoring

Actions resulting from this analysis and decision are subject to monitoring. Most of the monitoring needs are included in the Forest Plan, but additional monitoring requirements discussed in this EIS will be included in the Record of Decision for the selected alternative.

After lease issuance, exploration, development, and production activities are identified in a Surface Use Plan of Operations and may be subject to further monitoring requirements. Generally, a plan is submitted as either an Application for Permit to Drill (APD) or a Notice of Staking (NOS) and further NEPA analysis is conducted. In most instances, these activities are approved by the issuance of a drilling permit which allows for additional mitigation measures if necessary.

4.0.1 COMMON CONDITIONS AFFECTING IMPACTS TO ALL RESOURCES

The existing conditions described in Chapter 3 describe the effects to the various resources.

Current Leasing Status: About 25 percent of the lands under Federal control (Federal ownership, both surface and subsurface) on the Beartooth Ranger District are currently leased (see Chapter 3, Map 3.2). These current lessees can not be required to comply with new stipulations that result from the Record of Decision (ROD) based on this EIS. Therefore, these leases will not fall under the provisions of the ROD until existing leases terminate and new leases are issued.

Stipulations: Following is a brief description of lease stipulations and their effects on oil and gas development.

> **No Leasing: (NL):** No leasing is not a stipulation but is included so the reader understands that this is an option available.

No Surface Occupancy (NSO): With a No Surface Occupancy stipulation, use or occupancy of the land surface for fluid mineral exploration or development is prohibited. Well pads, roads, or other ancillary facilities are not permitted on areas with an NSO stipulation, unless a waiver, exception, or modification (WEM) is requested and granted. Appendix E discusses the circumstances under which WEMs can be granted for each alternative. An NSO stipulation does not, however, preclude another lessee or special-use permittee from crossing the NSO lease with a road or other linear facility. However, all such activities are subject to NEPA analysis and the management area direction in the Forest Plan.

Timing Limitation (TL): The TL stipulation limits drilling or construction for periods greater than the 60 day period of Standard Terms but less than the year-round limits of NSO.

Controlled Surface Use (CSU): The CSU stipulation is used to protect such things as the visual resources. They notify potential lease purchasers of special requirements or values to be protected, or of special mitigation measures that may be needed.

Standard Lease Terms (ST): Standard terms are attached to ALL leases. ST contain a number of constraints on development such as:

1) moving the proposed location of a drillsite up to 200 meters (about 0.12 mile) to avoid unacceptable impacts,

2) delay, or deactivate, a drill program for up to 60 days to protect key values.

ST also provides for protection of cultural resources, species listed under the Endangered Species Act, riparian areas, and floodplains.

Table 4.1 displays the number of acres of the various stipulations used by alternative. All leases have Standard Terms attached, but for comparison purposes the Standard Terms acres are those acres where other stipulations are not required.

TABLE 4.1

Acres by Stipulations by Alternative

AREA DESCRIPTION	ALT. 2	ALT. 3	ALT. 4	ALT. 4A	ALT. 5
NO LEASE	53,800	000	000	6,840	000
NO SURFACE OCCUPANCY-NSO	107,030	147,720	135,590	85,810	6,510
TIMING LIMITATION	200	9,980	4,310	12,700	11,270
CONTROLLED SURFACE USE-CSU	1,600	1,630	2,330	30	20,780
TIMING LIMITATION/CONTROLLED SURFACE USE-TL/CSU	000	000	000	470	000
STANDARD TERMS-ST	14,620	17,920	35,020	18,380	139,550
NOT AVAILABLE (AVAILABILITY DECISION)	860	860	860	53,880	000
TOTALS-DECISION AREA	178,110	178,110	178,110	178,110	178,110

Energy Requirements and Conservation Potential: NEPA regulations (40 CFR 1502.16e) require that alternatives be compared for the differences in energy requirements to implement the alternatives, and to compare conservation potential. The energy required would primarily be the fuels necessary to drill and pump the wells, construct the roads, and transport products from the well sites. On an individual well basis, fuel consumption decreases after production is established. Energy requirements are not discussed on a resource by resource basis, but the more exploration and development permitted under the various alternatives, the greater the energy requirements.

Monitoring Features Common to All Alternatives: The State of Montana Oil and Gas Conservation Division monitors oil and gas activities on both Federal and non-Federal minerals. The BLM also monitors oil and gas activities on federal leases.

For oil and gas activities under the management authority of the FS and the BLM, there are a variety of monitoring features in place that would be common to all the alternatives. The permitting processes for oil and gas operations, including the construction of new roads, are described in Chapter 1 in the section on the Federal Management of Oil and Gas Activities. The review necessary for approval of these permits will serve as initial monitoring of oil and gas activity resulting from the final EIS decision. Also the Forest Plan, pages 104-110, specifies monitoring criteria for various resource activities, including oil and gas exploration and development operations. Where there is consistency with the Forest Plan under any of the alternatives selected, these monitoring criteria and methods would be applied. Inconsistencies would require amendment to the Forest Plan. Specific monitoring requirements will be discussed in the Record of Decision.

4.1 EFFECTS ACROSS THE DECISION AREA

Section 4.1 discloses the effects of leasing available lands across the entire leasing decision area (Map 1A, Chapter 1). The environmental effects common to all five alternatives will be discussed first, followed by disclosure of specific environmental effects that could possibly occur from implementation of each of the various alternatives.

Topics are ordered by resource issue as presented in Chapters 2 and 3. The lands leased (or not leased), the location, and the lease stipulation(s) will vary the type, duration, and magnitude of environmental effects.

4.1.1 CONSEQUENCES TO THE OIL AND GAS RESOURCE

Direct and Indirect Effects

This analysis focuses on the effects to oil and gas occurrence potential, development potential, and public accessibility of oil and gas resources. Economic impacts resulting from oil and gas leasing and reasonably foreseeable oil and gas activities are disclosed in 4.1.10.

The following discussion describes potential effects to the oil and gas resource resulting from the mix and interrelationship between the availability decision, leasing decision, standard lease terms, and the type and amount of supplemental stipulations applied under each alternative.

Effects Common to Alternatives

Standard Lease Terms: With the exceptions noted below, standard lease terms permit year round occupancy on the leased lands and therefore provide full accessibility and the highest potential for discovery and utilization of oil and gas resources. The exploration drill site (rig) may be moved 200 meters and exploration operations may be delayed up to 60 days under standard terms to mitigate potential negative impacts to surface resources. Occupancy of the lease may be precluded by threatened and endangered plant and animal species and cultural resource laws. Should this occur, oil and gas resources may not be available for those portions of the lease restricted to assure recovery of threatened and endangered species and maintain cultural resource integrity. Effects to these resources can usually be mitigated but may involve a substantial increase in cost to the operator.

Controlled Surface Use: A controlled surface use (CSU) stipulation permits year-round occupancy on leased lands. It provides full accessibility and maintains the potential for discovery and utilization of oil and gas resources. CSU terms are designed to identify standards that must be met by operators and to control drilling or production operations to mitigate potential negative impacts to surface resources. For example, a drill rig may be required to be painted a color which will blend with the surrounding area to reduce visual impacts, or a production pumpjack may be required to meet a noise volume standard at a specific distance.

Timing Limitation: In addition to the standard lease terms, a timing limitation (TL) stipulation restricts occupancy on the leased lands for a period of time greater than 60 days. It provides partial accessibility for a portion of the year and maintains the potential for discovery and utilization of potential oil and gas resources. For example, a drill rig may be required to stop operations when elk occupy a critical calving area, or a production pumpjack workover rig may be precluded from performing routine maintenance activities when big horn sheep occupy a critical summer range.

No Surface Occupancy: A No Surface Occupancy (NSO) stipulation prohibits occupation of the surface for exploration or development of oil and gas resources. The majority of the acres having occurrence and development potential would be currently unavailable, leaving these resources available for future generations. Oil or gas deposits under NSO lands, but adjacent to private, State, or Federal lands permitting occupancy, could be reached using directional drilling up to perhaps a mile away. The development potential classification rating for NSO lands would be reclassified, probably as "very low". Production assumptions as described in Appendix B would not be realized.

Not Available and No Lease: The decision to make lands "not available" or to not authorize lands for leasing eliminates the exploration and discovery of potential oil and gas resources. The Forest Service national minerals policy "to encourage the exploration and development of mineral and energy resources" as expressed in the intent of Public Law 91-631 ratified by Congress in 1970 may not be met with a lands "not available" or "no lease" decision concerning lands with high or moderate occurrence and development potential.

Effects of the Alternatives

Alternatives A and 1

None of the decision area will be available for lease. About 131,100 acres (74 percent) of the classified oil and gas occurrence and development lands would immediately become unavailable under this set of alternatives. The remaining 46,000 acres are currently leased, so would remain available until 1998 when the last of the existing leases expire. After 1998, all (100 percent) classified occurrence and development potential acres would be unavailable. This would leave potential oil and gas resources available for future generations, but not for current use. These alternatives eliminate the potential to explore for and develop oil and gas resources.

Table 4.2 illustrates the well sites affected by each alternative. Under this set of alternatives, lands where the four well sites are located would not be leased. The production assumptions for the West Fork of Red Lodge Creek site as described in Appendix B would not be realized.

TABLE 4.2

Well Sites Constrained By Alternative

WELL SITE	ALT A,1;B,2	ALT B,3	ALT B,4	ALT B1,4A	ALT C,5
Dean Dome	0	+	+	+	+
West Red Lodge	0	+	+	+	+
Silver Run	0	0	+	0	+
Lake Fork	0	0	+	0	+

0 = Well Site could not be occupied due to Not Available, No Lease, or NSO stipulation.
+ = Well Site could be occupied due to Standard Terms, Controlled Surface Use, or Timing Limitation stipulations.

TABLE 4.3

Percent Acres Of Occurrence Potential Constrained By Alternative

HIGH OCCURRENCE POTENTIAL (100 percent equals 7,900 ac)

	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
NA	0	0	0	0	0	0
NL	100	0	0	0	0	0
NSO	0	70	68	60	98	0
TL	0	0	2	<1	2	0
CSU	0	15	15	0	0	0
CSU/TL	0	0	0	0	0	0
ST	0	15	15	40	0	100

MODERATE OCCURRENCE POTENTIAL (100 percent equals 105,830 ac)

	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
NA	<1	<1	<1	<1	38	0
NL	100	35	0	0	0	0
NSO	0	57	79	65	45	4
TL	0	<1	9	4	11	5
CSU	0	<1	<1	4	0	16
CSU/TL	0	0	0	0	<1	0
ST	0	7	11	26	5	75

TABLE 4.4

Percent Acres Of Development Potential Constrained By Alternative

HIGH DEVELOPMENT POTENTIAL (100 percent equals 870 ac)

	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
NA	0	0	0	0	0	0
NL	100	0	0	0	0	0
NSO	0	100	16	25	27	16
TL	0	0	30	0	55	0
CSU	0	0	0	0	0	0
CSU/TL	0	0	0	0	0	0
ST	0	0	55	75	18	84

MODERATE DEVELOPMENT POTENTIAL (100 percent equals 30,470 ac)

	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 5
NA	0	3	3	3	45	0
NL	100	54	0	0	0	0
NSO	0	32	73	57	21	8
TL	0	<1	11	1	19	13
CSU	0	0	0	5	0	22
CSU/TL	0	0	0	0	<1	0
ST	0	11	13	34	13	57

Alternative 2

Tables 4.4 and 4.5 disclose the percent acres of high and moderate oil and gas resource occurrence and development potential constrained by Alternative 2. About 70 percent of the high occurrence and 93 percent of the moderate occurrence potential would not be available. All (100 percent) of the high development and about 89 percent of the moderate development potential would be unavailable. Some of the lands leased with NSO stipulations may be indirectly accessible using directional drilling (perhaps a mile inbound) if they were adjacent to private, state, or Federal lands permitting occupancy.

Table 4.2 illustrates the well sites constrained by alternative 2. None of the well sites would be occupied for exploration, development, or production activities because the lands would not be leased (Silver Run and Lake Fork) or would have an NSO stipulation (Dean Dome and West Red Lodge). The production assumptions for the West Fork of Red Lodge Creek site as described in Appendix B would not be realized.

Alternative 3

Tables 4.3 and 4.4 disclose the percent acres of high and moderate oil and gas resource occurrence and development potential affected by alternative 3. About 68 percent of lands with high occurrence potential, and 80 percent of lands with moderate occurrence potential would not be accessible. About 16 percent of lands with high development potential, and 76 percent of lands with moderate development potential would not be accessible. The majority (85 percent or 748 acres) of high development potential lands are available. Some of the lands leased with NSO stipulations may be indirectly accessible using directional drilling (perhaps a mile inbound) if they were adjacent to private, state, or Federal lands permitting occupancy.

Table 4.2 illustrates the well sites constrained by alternative 3. Two of the four well sites could not be occupied because the lands would have a NSO stipulation. The Dean Dome and West Fork of Rock Creek sites could be occupied therefore, the production assumptions described in Appendix B could be realized.

The potential to explore for, discover, and develop oil and gas resources is severely limited or discouraged under Alternative 3 because the majority of lands with high and moderate occurrence potential and moderate development potential may not be accessed. The remaining lands may not have enough accessibility to high or moderate occurrence and development potential areas to justify the economic risks to attempt a discovery in a wildcat setting. In addition, the possibility of field development would be limited under this alternative because of large amounts of contiguous acres that cannot be occupied. Without the potential for field development, the risk associated with wildcat drilling would likely preclude exploration.

Alternatives B and 4

Tables 4.3 and 4.4 disclose the percent acres of high and moderate oil and gas resource occurrence and development potential constrained by alternatives B and 4. About 60 percent of lands with high occurrence potential and 66 percent of lands with moderate occurrence potential would not be accessible because of the occupancy restrictions (lands not available, not leased, or with NSO stipulations). About 25 percent of lands with high development potential and 60 percent of lands with moderate development potential would be inaccessible. The majority (75 percent or 660 acres) of high development potential lands are accessible. Some of the lands leased with NSO stipulations may be indirectly accessible using directional drilling if they were adjacent to private, state, or Federal lands permitting occupancy.

Table 4.2 shows well sites affected by alternatives B and 4. All four well sites could be occupied for exploration, development, or production activities. The production assumptions for the West Fork of Red Lodge Creek site as described in Appendix B could be realized.

The potential to explore for, discover, and develop oil and gas resources is severely limited or discouraged under alternative 4 because the majority of lands with high and moderate occurrence potential and moderate development potential may not be accessed. The remaining lands may not provide enough accessible acres classified as high or moderate occurrence and development potential to justify the economic risks to attempt a discovery in a wildcat geologic setting. In addition, the possibility of field development, should a discovery be made, would be limited under this alternative because most contiguous acres cannot be occupied. Without the potential for field development, the risk associated with wildcat drilling would likely preclude exploration. However, when compared to alternatives 1, 2, and 3, alternative set B and 4 increase the chance for a discovery because overall more land is accessible.

Alternatives B1 and 4A

Tables 4.3 and 4.4 disclose the percent acres of high and moderate oil and gas occurrence and development potential affected by alternatives B1 and 4A. Due to occupancy restrictions (lands not available, not leased, or having NSO stipulations), about 60 percent of lands with high occurrence potential and 66 percent of lands with moderate occurrence potential would not be accessible. About 25 percent of lands with high development potential and 60 percent of lands with moderate development potential would not be accessible. The majority (75 percent or 660 acres) of high development potential lands are accessible. Some of the lands leased with NSO stipulations may be indirectly accessible using directional drilling, if they are adjacent to private, state, or Federal lands permitting occupancy.

Table 4.2 illustrates the well sites constrained by Alternatives B1 and 4A. Two of the four well sites could not be occupied because the lands would not be available. The Dean Dome and West Fork of Rock Creek sites could be occupied; therefore, the production assumptions described in Appendix B could be realized.

The potential to explore for, discover, and develop oil and gas resources is severely limited or discouraged under alternative B1 and 4A because the majority of high and moderate occurrence and moderate development potential lands are not accessible. The remaining lands may not provide enough exploration acres of high or moderate occurrence and development potential to justify economic risks of attempting a discovery in a wildcat geologic setting. In addition, the possibility of field development, should a discovery be made, would be limited under this alternative, due to large amounts of contiguous acres that cannot be occupied. Without the potential for field development, the risk associated with wildcat drilling would likely preclude exploration. Alternative B1/4A are similar to B and 4 with regard to providing an increased chance for a discovery because more land is accessible when compared to Alternatives 1, 2, and 3. Alternatives B1/4A may be more limiting to the discovery of oil and gas resources because a third to one half of all moderate occurrence and development potential lands are not available or not leased under this alternative.

Alternative 5

Tables 4.3 and 4.4 disclose the percent acres of high and moderate oil and gas resource occurrence and development potential constrained by Alternative 5. All (100 percent) of the high occurrence potential lands would be accessible. About 4 percent of lands with moderate occurrence potential would not be accessible because of stipulation restrictions. About 16 percent of lands with high development potential and 8 percent of lands with moderate development potential would not be accessible. Some of the mineral resources on lands leased with NSO stipulations may be accessible using directional drilling if they are adjacent to private, state, or Federal lands permitting occupancy.

Table 4.2 shows the well sites constrained by alternative 5. All four well sites could be occupied for exploration, development, or production activities. The production assumptions for the West Fork of Red Lodge Creek site as described in Appendix B could be realized.

Since the majority of high and moderate occurrence and development potential lands are accessible under this alternative, the potential to explore for, discover, and develop oil and gas resources is maximized. Alternative 5 may provide enough acres that are classified as high or moderate occurrence and development potential to justify the economic risks to attempt a discovery in a wildcat geologic setting. In addition, the possibility of field development, should a discovery be made, would be possible under this alternative because there are large amounts of contiguous acres that can be occupied. This alternative increases the potential for field development, thus would likely encourage exploration. Alternative 5 has the highest chance for a discovery when compared to all other alternatives because more land is accessible.

Cumulative Effects

All lands (339,840 acres) within the Absaroka-Beartooth Wilderness are withdrawn and are not available for leasing. This leaves about 246,400 acres on the Beartooth Ranger District that can be considered for leasing. Prior to the Custer Forest Plan decision of 1987, all lands within the decision area (182,245 acres) were available for lease and experienced an active lease history. After the Forest Plan decision, about 77 percent of the decision area lands could not be occupied due to NSO stipulations, leaving about 33 percent of the decision area lands open to occupation. All leasing decisions were put on hold after the 1987 decision. Areas recommended for wilderness designation (11,812 acres) were also made unavailable in the 1987 Forest Plan Decision.

Availability Alternatives A and B1 would cumulatively add to the lands that are currently not available for leasing. Leasing alternatives 1, 2, and 4A would add to the lands that are not leased. The remaining acres that would be available for lease and that would allow occupancy may not be sufficient to justify the cost and economic risk associated with exploration unless it is done in conjunction with development on adjacent lands (private, state, or Federal) permitting occupancy.

The Shoshone National Forest decision on oil and gas availability and leasing could further reduce access to adjacent acres on the Custer National Forest.

Possible Conflicts With Plans and Policies of Other Jurisdictions

There are no known conflicts with plans and policies of state, county, or city jurisdictions that affect oil and gas resources specific to the alternatives.

Alternatives A, B1, 1, 2, 3, 4 and 4A, in reducing or limiting access to oil and gas resources, may be perceived as not fully meeting the spirit of the Minerals Policy Act of 1970 to "...foster and encourage private enterprise in the development of economically sound and stable domestic mining, minerals, metal, and mineral reclamation industries..." However, this policy further provides for "...the orderly development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security, and environmental needs...". Under all alternatives, effects to surface resources are mitigated to the degree that development would not conflict with plans and policies of other jurisdictions, including other Federal laws, such as the Endangered Species Act, Clean Water Act, National Historic Preservation Act, Wild and Scenic Rivers Act, etc. Alternative 5 tends to more fully meet the spirit of the Minerals Policy Act.

The "Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area" encourages the development of minerals, oil and gas, and sand, rock, and gravel. There may be a perception that Alternatives A, B1, 1, 2, 3, 4, and 4a may be inconsistent with that language. However, close examination of the Framework document reveals that all developments are encouraged only to the extent that it is economical and environmentally sustainable. The overriding concept of the Framework was to achieve consistency with the GYA. Of the Alternatives, number 5 could be viewed as most consistent with the development language of the Framework document.

Probable Environmental Effects That Cannot Be Avoided

Implementation of all alternatives will affect surface occupancy, development activities, and operating procedures and therefore, the accessibility to potential oil and gas resources. Alternative 1 would maintain the moratorium on oil and gas leasing.

Relationship Between Short Term Use and Long Term Productivity

Alternatives A and 1 leave all potential oil and gas resources available to future generations. Alternatives 2 through 5 make some potential oil and gas resources available for current use. Alternative 5 provides the opportunity for a higher degree of short term resource use. However, to provide oil and gas resources for future generations (that is, to provide for long term productivity) may require decades of unsuccessful prospecting and exploration in an area to make one economic discovery that could lead to production and field development.

Alternatives A, 1, and 2 eliminate all four well site locations, thereby prohibiting potential reasonably foreseeable exploration in those locations for the life of the leasing decision. Alternatives B1, 3, and 4A eliminate two well site locations, thereby limiting potential reasonably foreseeable exploration in those locations for the life of the leasing decision. Alternatives B, C, 4, and 5 maintain the potential for reasonably foreseeable exploration for all four locations.

Irreversible and Irretrievable Commitments of Resources.

The leasing decision is not an irreversible or irretrievable commitment of oil and gas resources because the Federal government can take back or reacquire mineral rights. However, once lease rights have been acquired by the lessee, "taking" or reacquiring the mineral rights could be expensive and difficult.

An irreversible or irretrievable commitment of oil and gas resources resulting from production during the life of this decision is not reasonably foreseeable.

Consistency With Forest Plan

Implementation of Alternatives A, B1, C, 2, 3, 4A, and 5 would require an amendment to the Forest-wide Direction and Management Area standards because these alternatives have different standards and stipulations than the current plan. Alternatives 1 and 4 are consistent with Forest Plan Standards. Alternatives A, B1, 1, 2, 3, 4 and 4A, in reducing or limiting access to oil and gas resources, may not be consistent with the intent of the Custer Forest Plan regarding the goal to "encourage the exploration and development of mineral and energy resources". Refer to Chapter 2, Table 2.4 for specific resources where the alternative stipulation does not meet current Forest Plan Standards.

4.1.2 ISSUE #1 SOILS, AIR, WATER, AND VEGETATION

4.1.2.1 SOILS

Direct and Indirect Effects

Soils: Effects on soils from oil and gas activities could include soil compaction, soil disturbance and erosion, and contamination due to spilling of fluids. Roads and well pads create more effects than other associated activities. The greatest effects occur during the initial phases of construction and lessen over time. Use of vehicles and heavy equipment off the roads can cause soil compaction which can lead to increased surface runoff and erosion. Soil compaction reduces soil productivity by reducing root penetration and water infiltration. It can also reduce free exchange of air and other gasses within the soil. Coarse-textured soils are not as susceptible to compaction as those with a larger component of silt or clay. Effects are most severe when the moisture content of the soil is high.

Water is the major erosive force, although wind and freeze-thaw action are contributing factors at high elevations. Erosion removes the top few inches of soil, which is the most important horizon because the surface litter and duff contains most of the soil nutrients. Such erosion is most likely to occur where vegetation has been removed. Impacts are thus greatest on shallow soils with little organic matter and low nutrient value, and on soils on moderate to steep slopes.

Effects on soils may occur from spills of fluids such as salt water, drilling fluids, or petroleum. Some fluids such as salt water can sterilize the soil. Transportation of hazardous materials related to oil and gas development is a risk. The Plan of Operations for any oil and gas activity contains a comprehensive safety plan, including spill prevention and containment measures to minimize risk to the human environment. See Appendix C for more detail.

Fragile and High Hazard Soils: About 49 percent of the entire decision area has soils considered fragile due to high potential for erosion; about half of these are alpine soils. In addition to the soil impacts already described, moist alpine soils are subject to thermokarsting, the melting of permafrost as a result of compaction. Shallow, rocky soils are also vulnerable to disturbance where even the mixing of surface and subsurface horizons can cause difficult revegetation problems. More extreme disturbance of alpine soils changes the thermal and water regimes, alters the depth of permafrost, and lowers water holding capacity and nutrient levels. If sulphide minerals are present, disturbance may initiate sulphide oxidation which can result in production of acidic soils (Biological Evaluation; Brown, Johnston, and Van Cleve, 1978 p 29; Brown and Chambers, 1990 p 329-333).

4.1.2.2 AIR

Air: Montana does not have specific air regulations for oil and gas drilling, but the Clean Air Act of Montana (1980, 1983) is administered by the Air Quality Bureau (AQB) of the Department of Health and Environmental Sciences, whose responsibilities include establishing emission control requirements and air quality standards, permitting facilities which are sources of regulated air pollutants, and monitoring ambient air quality. Drilling operations are generally exempt from air quality permit requirements because they are of short duration and are likely to be 100 tons or less.

Total effects on the air resource depend on the topography of the region, the magnitude of the emissions, and the prevailing meteorological conditions. Impacts would be minimal and limited to restricted areas near oil and gas facilities under all development alternatives. The potential effect of well site emissions on visibility were evaluated with VISCREEN model (Air Quality Report, Planning File). The VISCREEN analysis indicates that the nitrogen dioxide and particulate emissions associated with the well sites would be localized and produce very minimal impacts, which would be essentially invisible to observers from main road viewing points or from the Absaroka-Beartooth Wilderness boundary.

Effects of Development: Potential air quality impacts from oil and gas development include: 1) Dust during construction and from vehicle traffic on unpaved roads; 2) carbon monoxide and oxides of nitrogen from gasoline and diesel engines; and 3) hydrogen sulfide and sulfur dioxide from flaring and/or treater firing. Since each of the foreseeable well sites target the Greybull formation, no hydrogen sulfide should be encountered, and all other emissions are well within compliance with Montana and National Ambient Air Quality Standards, so no adverse effects to human health would be expected under any alternative. Exploration and production effects on the air resources expected with the four well sites can be found in section 4.2 under D Fishtail, B Butcher Creek, R West Fork of Rock Creek, and F Rock Creek management area discussions.

Effects of Production: Emissions associated with production would be considerably less than emissions from development, but some sulfur dioxide could occur from flaring hydrogen sulfide or burning sour gas in compressors or ancillary equipment. With the projected low emissions of nitrogen oxides and sulfur dioxides, as well as effects from prevailing winds, surrounding lakes will not be affected by acid rain.

Conclusion: No significant air quality degradation is expected from any of the alternatives, and minor air quality impacts from each action alternative are essentially equal.

Cumulative Effects - All Action Alternatives

Air: Exploration and production effects on the air resources associated with the four RFD well sites can be found in section 4.2 under D Fishtail, B Butcher Creek, R West Fork of Rock Creek, and F Rock Creek management area effects discussions.

All of the modeled concentrations for nitrogen dioxide and particulates, as outlined in the Air Quality Report (Project File) are well within Montana and National Ambient Air Quality Standards and considerably below Class II increment levels.

Air quality effects associated with oil and gas drilling and production in the Beartooth Mountains could include human health. At the levels of emissions normally associated with oil and gas operations, human health is not affected. The Air Quality Report (Project File) contains a discussion of hydrogen sulfide concentrations and associated health effects. However, each of the well sites target the Greybull formation, and no hydrogen sulfide should be encountered. All other emissions are well within compliance with Montana and National Ambient Air Quality Standards. No adverse cumulative effects to human health would be expected.

Due to the projected low emissions of nitrogen oxides and sulfur dioxides, as well as prevailing wind considerations, the chemistry of the surrounding lakes within the analysis area will not be adversely affected from any acid rain deposition.

Air quality effects within the planning area are projected to be very consistent for the action alternatives. No significant air quality degradation is expected from any of the alternatives considering the reasonably foreseeable development. Based on potential air quality impacts on these area-wide projections, the action alternatives are essentially equal.

4.1.2.3 WATER RESOURCES

Direct and Indirect Effects

Water: Oil and gas operations may affect water resources both within the area and downstream of the area. Analysis of the alternatives considers both possibilities. Of particular concern are potential impacts to water quality and quantity, particularly in riparian areas, wetlands, and floodplains. In these areas, mistakes and accidents could affect water quality despite application of best control technology and management practices. Wells on Federal leases are subject to more controls than those on lands with nonfederal minerals. However, all operations must meet minimum water quality standards set by the State and overseen by the U.S. Environmental Protection Agency. Because of these protective measures, impacts are related to spills, accidents, and mechanical or electrical failures.

Impacts from sedimentation from road construction would be similar under all alternatives. This is because the Forest Plan has standards for road construction which identify and control construction practices and which must be followed in all situations. Some alternatives produce more miles of new road than others.

Water Quality

Produced Water: Water produced from the geologic formations during drilling can be saline and has potential to contaminate surface and ground water, sterilize soil, and kill vegetation. Spills could occur during transport to a disposal well, contamination from leakage of the casing in the disposal well, and from upward migration from disposal wells.

Wastes: Wastes, such as drilling muds and wellbore cuttings, are usually disposed of in a reserve pit. The RFD projects a maximum of four wells, each with a reserve pit, and these reserve pits would add to the cumulative risks. Procedures for construction, operation, and closure of reserve pits are in Appendix C.

Sedimentation: Tests on hard granitics and metamorphic rock, similar to those in this area, have shown sediment from new road and well pad construction could amount to 10 tons/acre or less during the first year. With only about 50 acres disturbed by well siting over a 15-year period, as predicted in the RFD scenario, a total of 120 tons of sediment per well could be expected. This 10 tons per acre per well is about 1/10 of the annual sediment yield from undisturbed lands (100 pounds per acre, Beartooth Face Plan and Background Reports). Since lowest runoff occurs at low elevations where all four likely drilling sites are located, the increase may actually be less.

Spills: Oil and gas development always has potential for spills of crude oil, salt water, and drilling fluids, but the plan for disposal of wastes in the Surface Use Plan of the APD identifies management practices that will be used to prevent environmental damage. Special conditions such as those described in Appendix D, Conditions of Approval, may be required in the permit approval.

Off-site spills may be caused by trucking accidents, pipeline leaks, or construction mishaps, while spills on-site are usually caused by mechanical or electrical problems, corrosion, or human error. Since wells here are unlikely to encounter high levels of H2S, there is little corrosion problem expected.

Water Quantity: Quantity of water in streams can be increased by vegetation removal, as the water runs off the surface instead of percolating into the ground. If all four sites were developed and 50 acres disturbed at the same time, a maximum of 12.75 acre feet of additional water would run down the streams. Since an estimated 798,000 acre feet of water flow from the area currently, the increase would be very small. Since the RFD proposes that the four wells will be drilled over a 15-year period, the actual estimated amount of runoff will be considerably less than 12.75 acre feet.

Cumulative Effects - All Action Alternatives

Water: Exploration and development activities and facilities that are properly sited, designed, constructed, operated, maintained, and reclaimed should not have substantial impacts on the watershed or water resources.

There are a number of laws, regulations, policies, and guidelines that are specifically intended to reduce the environmental impacts of oil and gas activity on water-related resources. Wells on Federal leases are subject to more controls than those on nonfederal minerals, but all operations must meet minimum water quality standards set by the State and overseen by the U.S. Environmental Protection Agency. As a result of the protective measures required to protect water quality, impacts are typically related to spills, accidents, and mechanical and electrical failures.

Produced Water: Mistakes and accidents can still happen and oil and gas activity could affect water quality despite application of best control technology and management practices. Impacts could occur from one of three main stages in handling produced water. This would be during transport to a disposal well, leakage from the casing in the disposal well, and upward migration from disposal well.

Produced water is normally transported to underground injection wells by trucks or pipelines. The potential exists for spills to occur during transportation. There are numerous standards to ensure that injection disposal wells do not eventually pollute "freshwater" aquifers. There are regularly scheduled tests to confirm that freshwater zones are isolated from the disposal zone. Even so there remains a small chance that freshwater can be contaminated. However, produced water from this particular region is not known to be as highly saline.

There are no disposal wells in the vicinity of the decision area. Any produced water would have to be trucked some distance for disposal unless the water was pure enough to treat and release into surface water or shallow groundwater aquifers.

The RFD scenario projects that a maximum of four wells will be drilled. Each well drilled will require drilling fluids and the construction of a reserve pit even though the driller may use a closed-circulation mud system. Reserve pits must be reclaimed within six months after the well is completed, weather permitting. Additional reserve pits would add to the cumulative risks associated with such structures. Once a pit is reclaimed there is a possibility of leakage. This leakage could contain toxic materials although most of these chemicals are removed from the pit before its reclamation.

Sedimentation: Based on discussion found under cumulative effects to issue #1, there are very minimal anticipated cumulative effects from sedimentation resulting from the reasonably foreseeable development scenario under any action alternative.

Several factors affect the rate of sediment movement. These include presence of running surface water from rainfall or snowmelt, distance the sediment must move before entering a drainage, slope of the land, type of vegetation on the slope, and soil type. The Beartooth Mountains produce moderately high amounts of runoff from snowmelt each year. Lowest runoff amounts occur at low elevations around the edge of the mountains. This is where all four of the likely drilling sites are located.

Runoff water from undisturbed watersheds in the Beartooth Mountains carries very low volumes of sediment. The present amount of roading and other surface disturbances cause only small additional amounts of sediment to enter streamwater. Obvious sources of accelerated sediment production are abandoned mines and grazing allotments where livestock trample and/or overgraze the vegetation.

Access to and surface occupancy of the various landtypes are regulated somewhat differently from one Alternative to the next. Relative differences in impacts to water quality will not vary greatly because roads and wellpads would affect such small areas even in the most development-oriented alternatives.

Impacts caused by roads would be similar under all alternatives because the surface requirements of the Forest Plan would apply wherever a road occupies National Forest System lands. Alternatives 4 and 5 would produce more miles of road than alternatives 3 and 4a. No roads would be produced or used for oil and gas activities under Alternatives 1 and 2.

Potential Effects of Spills on Water Quality: Oil and gas development always provides the potential for spills of oil, crude oil, salt water, and drilling fluids. The plan for disposal of wastes submitted as part of the Surface Use Plan at the APD stage is intended to demonstrate the management practices that will be used to prevent environmental damage. Special conditions such as those described in Appendix D Conditions of Approval, may be required of the operator in order to receive permit approval.

Off-site spills are usually caused by trucking accidents, pipeline leaks, or by construction mishaps such as cutting an existing pipeline. Spills occurring on-site are usually caused by mechanical or electrical problems, corrosion, or human error. Projected wells here are unlikely to encounter high levels of H2S. Thus, there is less likelihood of serious corrosion problems.

Impacts to surface water quality are generally short term whereas ground water contamination is a long-term problem. Ground water contamination on the other hand is considered irreversible and irretrievable because it may last for decades or centuries. Contamination of aquifers can eventually result in surface water impacts where the groundwater is in contact with surface water. The proposed drillsites appear to have groundwater aquifers with pretty close contact to surface water.

Water Quantity: Water yields can be affected by vegetation removal. In this proposal there should be no measureable nor significant change in runoff volumes because such a small surface area would be altered. For each acre of land converted into road or wellpad surface, about 0.25 acre foot of extra runoff would be realized annually. This means that if all four sites were developed and 51 acres disturbed, a maximum of 12.75 acre feet of additional water would run down the streams. Since an estimated 798,000 acre feet of water flow through the channels currently, the anticipated increase would be very small.

4.1.2.4 RIPARIAN, FLOODPLAINS AND WETLANDS

If unmitigated, or if sites are occupied, damage could occur on riparian, floodplain, or wetland areas from actual loss of acreage or from contamination by spills of oil, brinewater, or other waste materials. Sites in or near riparian, floodplain, or wetland may have a shallow groundwater table and/or nearby surface water which could be affected.

Under all alternatives, wells accessing Federal minerals would be subject to the following constraints as a minimum. Additionally, even under Standard Lease Terms, proposed well sites can be moved 200 meters.

Riparian Areas: Surface use plan proposing use of riparian areas must identify the mitigation measures necessary to protect that riparian area. If approved, the mitigation measures will be made part of the operational permit.

Floodplains: Any facilities built on the floodplain of a stream, whether perennial or not, must be designed so the 100-year-frequency flood will not cause a threat to lives of people involved with that facility as outlined in Executive Order 11988. Siting must not create an obstruction to flow of water and the design must be able to withstand projected flows without suffering significant damage. The facility must also not pose a threat to water quality whatever the streamflow level, so there must be no chance that a stream could flow through a reserve pit.

Wetlands: Wetlands not in the path of construction could be impacted by migration of surface spills or contamination of shallow aquifers. Executive Order 11990, Federal Wetland Regulations, and recent Swampbuster legislation, require the Federal Government to manage the land with no net loss of wetland acres under all alternatives. Therefore under all alternatives, loss of wetlands must be mitigated.

4.1.2.5 VEGETATION

Vegetation will be removed on roadbeds and on drillpad sites. When the facilities are no longer needed, reclamation is conducted. Reclamation involves reestablishing the major species that were on the site before disturbance occurred. However reestablishing the original plant community will take time, especially in alpine communities.

Plant communities: Some vegetative communities such as mountain meadows, streamsides, and wet alpine areas are communities that are not common in the decision area or in adjacent areas. Construction activities can remove parts of some plant communities. However, activities proposed in the RFD do not totally eliminate any plant communities or cover types.

Noxious Weeds: Most noxious weeds are very competitive and spread by seed, rhizomes, or both. Disturbance increases the risk of introducing noxious weeds, and if introduced and allowed to spread, wildlife, livestock, and watershed resources could be reduced.

Sensitive Plant Species and Species of Concern: Sensitive or rare plant species in the area are characterized by small isolated populations which occupy microsites. Recovery of a sensitive species requires protecting the known population and sites or habitats they are capable of occupying under colonization.

A lease notice will be applied to any lease which contains identified sensitive species habitat (Appendix E). The lease notice will require an on-the-ground inventory before ground-disturbing activities are permitted. If a population of plants or suitable habitat was not detected in the 1991 survey, there is some risk of undiscovered plants or habitat being destroyed by development. However, surveys will be required within ¼ mile of proposed drill sites and access roads. A full analysis of potential effects will be made and some restrictions or movement of a drill site may be required.

Reclamation

Reclamation is defined as returning the land to comparable utility and function. Original vegetation species composition, abundance, and structure, or original topographic contours and features do not necessarily need to be attained, as long as goals for the land's utility and function are met.

General Reclamation: As outlined in Appendix C, reclamation is required following oil and gas development. Saving the original soil is critical, but maintaining soil production capability depends on protecting the soil from erosion or compaction, and on the addition of organic material over time. Disturbances in fragile soils which have low revegetation potential can cause long-term loss of site productivity. Prolonged stockpiling of topsoil may cause some loss of fertility. However, studies have shown that there is not generally a great loss of chemical constituents or organic matter for several years if the pile is properly located and shaped to reduce leaching.

Alpine Reclamation: Because of highly specialized physiological requirement of adapted species and the rigorous atmospheric and edaphic environments of the alpine region, traditional revegetation techniques do not succeed. Studies have found that even less severe disturbances, such as freeze-thaw cycles and small animal burrowing, may leave the soil in place, but mix surface and subsurface horizons. More extreme disturbances remove organic soil components so that nutrient and water-holding capacity is lowered, wind erosion increases, and loss of the fine-textured soil fraction results. These studies indicate that introduced species used for revegetation are generally unsuccessful, but native plant species perform much better. Overall, lands disturbed in alpine meadows, bogs, and shallow, rocky soils are extremely difficult to reclaim and may require more than five years to revegetate, but natural recovery may take centuries. General recommendations for alpine reclamation based on research studies are found in the project file.

SUMMARY TABLE:

Table 4.5 displays the number of acres of the various resources associated with this issue and the stipulations used. All leases have Standard Terms attached. For comparison purposes the Standard Terms acres are those acres where there are not other stipulations required.

Table 4.5
Issue 1, Acres by Stipulation by Alternative

Acres by Stipulation	1	2	3	4	4A	5
High Hazard & Fragile Soils						
No Leasing (NL)	94,080	24,490			5,230	
Not Available (NA)		120	120	120	27,930	
No Surface Occupancy (NSO)		69,470	93,960	93,960	60,920	2,690
Timing Limitations (TL)						4,210
Controlled Surface Use (CSU)						16,010
Standard Terms (ST)						71,170
Sensitive Plant Habitat						
No Leasing (NL)	18,740	10,790			2,120	
Not Available (NA)		120			12,070	
No Surface Occupancy (NSO)		7,680	17,370	15,930	4,210	1,290
Timing Limitations (TL)			1,200	270	160	840
Controlled Surface Use (CSU)			60	870		3,680
Lease Notice (LN)		150	110	1,670	180	12,930
Sensitive Plant Sites						
No Leasing (NL)	30	30				
Not Available (NA)					30	
No Surface Occupancy (NSO)			30	30		
Lease Notice (LN)						30
Riparian						
No Leasing (NL)	8,650	2,030			1,110	
Not Available (NA)		40	40	40	2,080	
No Surface Occupancy (NSO)		6,580	8,610	8,610	5,460	5,550
Controlled Surface Use (CSU)						20
Standard Terms (ST)						3,080

4.1.3 ISSUE #2 FISH AND WILDLIFE

4.1.3.1 DIRECT AND INDIRECT EFFECTS COMMON TO ALL ALTERNATIVES

Stipulations are assigned to particular lease tracts in order to mitigate potential effects to surface resource which exist on that particular parcel of land. Each stipulation has a particular set of direct and indirect effects associated with implementation of the stipulation. Similarly, parcels of land which are not assigned a stipulation (Administratively Unavailable, No Lease, or Standard terms) would also experience a particular set of direct and indirect effects depending upon the level of resource consideration assigned to these areas. The general direct and indirect effects of these stipulations or considerations are discussed below.

Administratively Unavailable and/or No Lease

Lands within the decision area, which are assigned these levels of resource considerations are precluded from subsurface minerals extraction. Oil and gas resources which lie under these areas could not be accessed or removed. Making a particular piece of land unavailable or not leasing the minerals does not prevent use or occupation of the lands surface. Ground disturbances associated with drill pad placement or access road construction still could take place within areas which are either administratively unavailable or not leased. This could result due to approval of a special use permit allowing these activities to occur in order to access a geologic target in an adjacent management area which does not permit surface occupancy.

If ground disturbances where to occur, direct and indirect effects such as animal displacement to sub-optimum habitats, home range fragmentation, increased potential for harvest by humans (legal or illegal), increased physiological stress, decreased productivity, and overall increased mortality may occur.

NSO Stipulation

For the purposes of analysis, and in order to provide the decision maker with a full range of alternatives as required by the National Environmental Policy Act of 1969, the NSO stipulation will be applied in two different ways.

Under alternatives 2, 3, 4 and 5, A NSO stipulation would preclude only pad placement on a tract of land which is leased with this stipulation. In these instances, direct and indirect effects associated with NSO leases may include increased physiological stress, home range or habitat fragmentation, increased suseptability to legal and illegal hunting (mortality), and potential displacement from established home ranges.

Under alternative 4a, tracts of land leased with a NSO stipulation would not experience oil and gas related ground disturbances such as drill pad construction or access road construction and occupation during the exploration phase of oil and gas activities. Additionally, in the event that oil and gas resources were found on a portion of a NSO lease, due to directional drilling, no production facilities such as pipelines or oil storage tanks would be permitted on any portion of a NSO lease. Under the terms of the lease, the area would remain essentially unchanged from pre-lease conditions.

Therefore, potential adverse direct and indirect effects to established home ranges or potential habitat would be eliminated on those portions of the landscape which are leased with a NSO stipulation. Environmental consequences such as displacement of wildlife to sub-optimum habitats, increased physiological stress, reduced habitat effectiveness, habitat fragmentation, increased susceptibility to human related mortality (legal and illegal hunting), and reduced biological diversity would not be anticipated to take place within lands leased with a NSO stipulation under alternative 4a.

TL Stipulations

Tracts of land leased with a TL stipulation would experience oil and gas related ground disturbances resulting from occupation of the lease surface. These ground disturbing activities would consist of well pad construction, access road construction, construction of production facilities and use of these facilities. Under the terms of the lease, the surface of the land would experience some degree of modification as compared to pre-leasing conditions.

Potential adverse wildlife environmental consequences (direct and indirect effects) could consist of displacement to sub-optimum habitats, increased physiological stress, reduced habitat effectiveness, increased susceptibility to legal and illegal harvest, habitat fragmentation, and reduced biological diversity within the tract of land leased with a TL stipulation.

TL stipulations afford a degree of mitigation to wildlife species which use areas leased with this level of stipulation. These mitigation measures typically are aimed at avoiding conflicts which may arise due to joint occupation of a specific tract of land by both wildlife and oil and gas activities. Under the terms of TL leases, occupation or use of the lands surface by oil and gas activities can be precluded during a critical wildlife use period. Employing this level of leasing stipulation would be anticipated to reduce but not totally eliminate direct and indirect effects to the wildlife resources in the area.

CSU Stipulations

Tracts of land leased with a CSU stipulation would experience oil and gas related ground disturbances such as drill pad construction or access road construction and occupation. Under the terms of the lease, the area would experience some degree of modification as compared to pre-leasing conditions.

Potential adverse wildlife environmental consequences (direct and indirect effects) could consist of displacement to sub-optimum habitats, increased physiological stress, reduced habitat effectiveness, increased susceptibility to legal and illegal harvest, habitat fragmentation, and reduced biological diversity within the tract of land leased with a CSU stipulation.

CSU stipulations afford a degree of mitigation to wildlife species which may inhabit areas leased with this level of stipulation. These mitigation measures typically are aimed at decreasing the visual and audible effects which may result from exploration, development, and production. Mitigation activities such as painting oil and gas facilities earth tones, and placing mufflers on motors, or requiring down hole motors in order to reduce noise associated with the oil and gas activities, would be anticipated to reduce, but not eliminate adverse impacts to wildlife within or adjacent to lands leased with CSU stipulations.

Standard Lease Terms

Tracts of land leased with standard terms would experience oil and gas related ground disturbances resulting from occupation of the lease surface. These ground disturbing activities would consist of well pad construction, access road construction, and use of these facilities. Under the terms of the lease, the area would experience modification of surface resources as compared to pre-leasing conditions.

Potential adverse wildlife environmental consequences (direct and indirect effects) could consist of displacement to sub-optimum habitats, increased physiological stress, reduced habitat effectiveness, increased susceptibility to legal and illegal harvest, habitat fragmentation, and reduced biological diversity within the tract of land leased with a TL stipulation.

If a tract of land is leased with standard terms, provisions are automatically invoked which provide a degree of protection to surface resources including the wildlife resource. These provisions provide the surface management agency with the following options; 1) the Forest Service can requir the operator to move the drill location up to 200 meters in order to avoid unacceptible impacts, 2) the Forest Service can require the operator to delay, or deactivate a drill program by 60 days if it is demonstrated that drilling operations during a specific time period would cause unacceptable impacts to wildlife resources.

Currently, there exist large acres of seasonal home ranges for various wildlife species within the decision area. !n most instances wildlife occupy these seasonal ranges for a period of greater than 60 days. The actual time of range occupation depends on many environmental factors such as snow, drought, forage availability, etc. If a leasee/operator were denied the ability to activate a drill program for 60 days, effects to the wildlife resources could still occur. The most immediate impact would be displacement from an occupied seasonal home range. This in turn could lead to a reduction in herd productivity, and increased mortality due to decreased nutrient intake, increased predation, or increased vulnerability to hunting pressure.

As a part of standards term leases provisions are automatically invoked which provide a high degree of protection for designated Threatened or Endangered Species (T&E). These provisions provide the following protection. "The Forest Service is responsible for assuring that the land is examined prior to undertaking any surface disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. **The findings of this examination may result in some restrictions to the operator's plan or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats."** (Forest Service Form R1-FS-2820-13 (1/90))

As a result of these provisions substantial levels of protection for Threatened or Endangered Species and their habitats is afforded. However, until as site specific Application for Permit to Drill (APD) is received by the Bureau of Land Management and the Forest Service, the exact method of species protection is unknown. A strict interpretation of standard lease terms indicates that no occupancy of the lease may be required if the Forest Service, in conjunction with the US Fish and Wildlife Service, determines threatened or endangered resources can only be protected in this manner.

It must be further noted that all lease tracts, regardless of additional stipulations, are automatically leased with standard term provisions.

4.1.3.2 AQUATIC RESOURCES AND FISHERIES.

Sensitive Species

Yellowstone Cutthroat Trout: Given the general nature of the leasing proposal being evaluated and the limited amount of site specific information on Yellowstone cutthroat trout, the only possible determination of effect would be that specific populations could likely be influenced. At this point it is impossible to determine if the leasing alternatives being considered would contribute to or result in a trend toward Federal listing. Each and every site specific exploration proposal will have to be evaluated in order to describe the nature and scope of potential impacts. the pending conservation strategy that is currently being developed calls for the restoration of Yellowstone Cutthroat trout to a portion of the historic range currently unoccupied. As this conservation strategy is implemented the potential for increased coordination with oil and gas exploration and development will be needed.

Only one population of "genetically pure" Yellowstone cutthroat trout is currently known to exist within the analysis area. Several other populations are believed to be "genetically pure" but they have not been tested. Other populations have the potential to exist and efforts are underway to validate the current status. A detailed survey for Yellowstone cutthroat trout will be required and a biological evaluation prepared at the time an APD/NOS is filed. If this subspecies is found to be potentially affected by the proposed well, mitigation and/or protective requirements will be designed to preclude or minimize adverse direct or indirect effects. With this provision, selection of any alternative would not have a direct or indirect effect on Yellowstone Cutthroat Trout. Generic and specific discussion of effects will be addressed in the Aquatic Resources/Fisheries section.

Direct and Indirect Effects

Exploration of oil and gas has the potential to directly affect the aquatic flora and fauna within the analysis area by causing mortality. Mortality would most likely be from chemical spills and leaks into streams. Transportation - related accidents (spills) would be a major means by which contaminates could enter streams. Other potential contaminants could be seepage at fuel storage facilities or loss of crude oils associated with the well. Field and laboratory evidence demonstrates both acute, lethal toxicity and long-term sublethal toxicity from oils and petroleum distillates to aquatic organisms.

Lethal toxicities can be highly variable, depending on the type of petroleum compound and the flora or fauna involved. Crude oil in concentrations as low as 0.4 mg/l can be extremely toxic to fish. All trout, including Yellowstone cutthroat trout, that occur within the analysis area would be subject to mortalities if sufficient quantities of petroleum compounds were released into the streams and lakes of the area. Also, certain petroleum products which appear to have no soluble poisonous substances become deadly when emulsified by agitation, as would be the case in turbulent stream flows. Oily substances may be harmful to fresh-water aquatic life.

Drilling fluids, reserve pits, storage pits, and chemical tanks that may contain toxic substances may also be a source of contaminants. Management practices that lessen the potential for these releases to occur will be required. The potential for adverse effects can be lessened by requiring the use of drilling fluids which contain no toxic compounds or substances. Water produced at the drilling site can be highly saline and has the potential to contaminate surface and ground waters to levels that could cause localized mortality of aquatic flora and fauna. Riparian vegetation could also be affected. It is not expected that waters produced within the analysis area would be highly saline to the point of causing direct mortality but there is a possibility that a rare occurrence could occur.

Direct mortalities could also result from the failure of waste water storage facilities and the resultant increase of sediment generated by the erosion that may be caused.

The indirect effects on the aquatic ecosystems within the analysis area are associated with modification or loss of habitat, such as disturbance of streamside vegetation and changes in stream flows.

Sedimentation: Sediment delivered to stream channels influences aquatic habitats in several ways. First is influence on streambed composition. Changes in streambed composition can influence egg and embryo survivals. As fine sediments increase, survival of deposited eggs begin to decrease. Excessive amounts of fine sediments are also detrimental to the micro- and macro-invertebrates. The second aspect concerns changes that can occur in channel form. Excessive amounts of sediment can change channel function and form. Pool features can become inundated with sediment and the interstitial spaces in the substrate can become clogged thereby reducing the holding capability for fish and other aquatic organisms.

Petroleum Compounds: In addition to direct mortalities attributed to petroleum compounds, these pollutants may be incorporated into sediments. The persistence of unweathered oil within the sediment could have a long-term effect on the structure of the benthic community or could cause the demise of specific sensitive important species. Oils within aquatic environments have the potential to alter habitat conditions drastically thereby causing drowning of waterfowl because of loss of buoyancy, exposure because of loss of insulating capacity of feathers, and starvation and vulnerability to predators because of reduced mobility. Petroleum compounds can also taint edible aquatic species.

Adverse Water Quality: Potential of production of saline water exists and the potential for indirect effects cannot be total discounted. Subtle changes in salinity of surface water can cause changes in the aquatic flora and fauna. This is not anticipated to be a problem. Any onsite disposal should require treatment and quality verification.

Disturbance of Streamside Vegetation: Potential exists for disturbance of streamside vegetation, if unmitigated. Most of this disturbance can be minimized or eliminated through NSO stipulations within the riparian zone. But potential exists for vegetation disturbance associated with road building and fire.

Changes in Stream Flow: Changes is stream flow have been shown to influence aquatic biota. Extreme increases in flows can exert a scouring action that can be detrimental to aquatic invertebrates by reducing their numbers and distributions. Fish are also influenced by elevated flows and the corresponding increases in velocity.

Reduction of stream flow can also exert a negative influence on the aquatic ecosystem. Reduced stream discharge results in reduction of available habitat for fish and other aquatic flora and fauna. Partial dewatering of stream channels can lead to elevated water temperatures during summer periods. During winter months, reduced flows can result in over-winter mortality due to limited holding pools of sufficient depth. Complete dewatering of stream channels exerts a catastrophic impact on all components of the aquatic environments.

Increased Utilization of the Fishery Resource: Leasing could result in increased use pressures responding to population growth within the area, thus exert negative influences on fish populations. It may become necessary for the MDFWP to impose more restrictive fishing regulations to protect the fishery resource. At this point in time it is difficult to adequately project the magnitude of potential use changes.

Effects of the Various Alternatives

Availability: Under Alternative A there would be no expected effects to Yellowstone cutthroat trout or the associated habitat. Nor would there be any influence on the other aquatic flora and fauna. For Alternatives B, B1, and C, potential effects would be similar to those previously mentioned in the direct, indirect and cumulative effects remarks. There are no differences between availability Alternatives B and C with regard to the effects on the aquatic flora and fauna. Under alternative B1 there would be no anticipated effects on the aquatic resources within the West Rock Creek drainage.

Leasing Alternative 1: (No Action and No New Leasing) Under this alternative the decision to lease specific lands would be deferred. Current leases would be allowed to continue but they might expire unless exploration or production occurred. Environmental effects would be expected to be the lowest of the leasing alternatives. Under Alternative 1, there would be no expected effects to Yellowstone cutthroat trout or the associated habitat. Nor would there be any influence on the other aquatic flora and fauna. Geophysical information collection might occur and the effects would be covered under the site specific NEPA analysis.

Leasing Alternative 2: For the areas excluded from leasing in this alternative, the associated fishery resources and other aquatic flora and fauna would be unaffected. This alternative provides for stipulations to mitigate effects to aquatic resources. No Surface Occupancy (NSO) would be allowed within 300 feet of habitats containing or presumed to contain genetically pure populations. Lease notices (LN) would also be issued to heighten the awareness of the existence of a sensitive species. The NSO stipulation within riparian management areas provides for a 100-foot buffer to lessen potential effects to other aquatic flora and fauna.

Direct effects of oil and chemical spills could occur but cannot be predicted. Indirect effects associated with increases in sediment and potential oil and chemical contamination could occur but should be minimized by NSO stipulations. Application of Best Management Practices (BMP's) to the site specific exploration activities (e.g. road building and maintenance, pad development, material storage facilities, etc.) will provide additional mitigation. Site-specific proposals will be evaluated in relation to the amount of sediment anticipated from the ground-disturbing activity and the relative risks associated with oil spill and other chemical contamination. Site-specific drilling proposals will also be evaluated for cumulative effects associated with oil and gas development and other land use activities. Disturbance of stream or lake side vegetation should be minimal given the NSO stipulation.

Under this alternative, the RFD for the Red Lodge site is considered. This site is within a drainage that is presumed to contain Yellowstone cutthroat trout. NSO and LN stipulations would apply. Anticipated direct, indirect, and cumulative effects would be similar to those previously discussed for leasing in general. It is anticipated that the road reconstruction and construction will generate sediment that will be delivered to stream. The specific amounts are undetermined at this time. Application of BMP's appropriate to the site will be applied consistent with compliance with State water quality standards.

Leasing Alternative 3: Under this alternative, those acres associated with Situation I grizzly bear habitat and recommended wilderness would be excluded from leasing. For these areas the associated fishery resources and other aquatic flora and fauna would be unaffected. In addition, this alternative applies stipulations to mitigate possible effects to aquatic resources. No Surface Occupancy (NSO) is applied to areas within 300 feet of habitats containing genetically pure populations. Lease notices (LN) will be issued to alert to the existence of sensitive species. The NSO stipulation within riparian management areas provides for a 100-foot buffer to lessen the potential effects to other aquatic flora and fauna.

The anticipated direct, indirect, and cumulative effects would be similar to those identified for Alternative 2. Application of BMPs should also be similar. The buffer capability and added protection associated with the NSO stipulation would be reduced for those Yellowstone cutthroat trout populations presumed to be pure but not genetically validated.

The well site hypothesized for this alternative is in a drainage that is presumed to contain Yellowstone cutthroat trout. NSO and LN stipulations would apply. Anticipated direct, indirect, and cumulative effects would be similar to those previously discussed for leasing in general. Road reconstruction and construction may generate sediment that could be delivered to streams if unmitigated. The specific amounts are undetermined at this time. Application of BMPs appropriate to the site will be applied consistent with compliance with State water quality standards.

Leasing Alternative 4: Lease notices (LN) will be issued to increase awareness of the existence of a sensitive species and riparian dependent aquatic resources. The NSO stipulation within riparian management areas provides for a 100-foot buffer to lessen the potential effect other aquatic flora and fauna.

The anticipated direct, indirect, and cumulative effects would be similar to those identified for Alternatives 2 and 3. Application of BMPs should also be similar. The buffer capability and added protection associated with the NSO stipulation will be reduced for Yellowstone cutthroat trout populations. All aquatic environments will be protected by the NSO stipulation associated with riparian areas. Application of BMPs should be similar to Alternatives 2 and 3.

Under this alternative, the RFD hypothesizes four well sites. The West Fork of Red Lodge site is within a drainage that is presumed to contain Yellowstone cutthroat trout. The Dean Dome site is closely associated with the Fishtail Creek drainage. The Silver Run site is associated with Silver Run Creek and the West Fork of Rock Creek. Lake Fork of Rock Creek site is associated with Lake Fork and main Rock Creek. Yellowstone Cutthroat trout are presumed to occur in main Rock Creek but have not been identified in Silver Run, West Fork of Rock Creek or Lake Fork. Lease Notices would be used to heighten awareness and need for Yellowstone cutthroat trout and riparian protection. Anticipated direct, indirect, and cumulative effects for both sites would be similar to those previously discussed for leasing in general. If unmitigated, road reconstruction and construction could generate sediment that could enter both streams. However, Forest Plan standards and guidelines for road construction applies for all lands. The specific amounts of possible sedimentation are undetermined at this time, but it is expected that due to the availability of all lands for exploration, including riparian zones, that effects could be increased. Application of BMPs appropriate to the sites will be applied consistent with compliance with State water quality standards.

Leasing Alternative 4A: There would be application of the management direction contained in the Custer Forest Plan. Lease notices would be issued to increase awareness of the existence of a sensitive species and riparian dependent aquatic resources. The NSO stipulation within riparian management areas provides for a 100-foot buffer to lessen the potential effect other aquatic flora and fauna.

The anticipated direct, indirect, and cumulative effects would be similar to those identified for Alternatives 2, 3 and 4. Application of BMPs should also be similar. The buffer capability and added protection associated with the NSO stipulation would be reduced for Yellowstone cutthroat trout populations. All aquatic environments would be protected by the NSO stipulation associated with riparian areas. Application of BMPs should be similar to Alternatives 2 and 3.

Under this alternative, the RFD hypothesizes two well sites - Dean Dome and West Fork of Red Lodge Creek sites. The West Fork of Red Lodge site is within a drainage that is presumed to contain Yellowstone cutthroat trout. The Dean Dome site is closely associated with the Fishtail Creek drainage. Yellowstone Cutthroat trout have not been identified as occurring in the drainage. NSO and LN stipulations would apply and be implemented on all riparian areas and as such the stipulations would apply for 100 feet from all lakes and streams. Anticipated direct, indirect, and cumulative effects for both sites would be similar to those previously discussed for leasing in general. If unmitigated, road reconstruction and construction could generate sediment that could be delivered to both streams. BMPs appropriate to the sites will be applied consistent with the Forest Plan and in compliance with State water quality standards.

Leasing Alternative 5: Under this alternative all lands will be authorized for leasing. There would be no stipulations requiring NSO within any riparian areas. Leasing notices would be issued to highlight the present or possible presents of Yellowstone cutthroat trout within the analysis area. These notices would also identify the riparian zone management criteria mandated by the National Forest Management Act (NFMA).

The potential for negative direct, indirect, and cumulative effects could be somewhat more pronounced under this alternative. Exploration facilities would be permitted in close proximity to aquatic environments containing Yellowstone cutthroat trout and other aquatic flora and fauna. The possibility of negative influences previously discussed would be increased. Application of BMPs should be similar to the other alternatives.

Under this alternative, the RFD hypothesizes that all four (4) of the identified sites will be drilled. The West Fork of Red Lodge site is within a drainage that is presumed to contain Yellowstone cutthroat trout. The Dean Dome site is closely associated with the Fishtail Creek drainage. The Silver Run site is associated with Silver Run Creek and the West Fork of Rock Creek. Lake Fork of Rock Creek site is associated with Lake Fork and main Rock Creek. Yellowstone cutthroat trout are presumed to occur in main Rock Creek but have not been identified in Silver Run, West Fork of Rock Creek or Lake Fork. NSO stipulations would not be applied. Lease notices would be used to heighten awareness and need for Yellowstone cutthroat trout and riparian protection. Anticipated direct, indirect, and cumulative effects for both sites would be similar to those previously discussed for leasing in general. Road reconstruction and construction may generate sediment that could be delivered to both streams. The specific amounts are undetermined at this time, but it is expected that due to the availability of all lands, including riparian zones, for exploration that effects will be increased. However, adherence to Forest Plan standards and guidelines and application of BMP's appropriate to the sites will be applied to assure compliance with State water quality standards.

4.1.3.3 WILDLIFE

Species Eliminated From Further Analysis

Sensitive Species

Ferruginous Hawks: Ferruginous hawks are considered a species of the western plains. Vegetation communities within either the analysis area or the decision area are considered marginal nesting habitat for this species. Ferruginous hawks have not been reported on the Beartooth Ranger District. None of the alternatives will effect the ferruginous hawk or habitats required by this species.

Big Game Species

Mountain Lions: Occurrence of mountain lions within the decision area is widespread. Populations are believed to be near an all time high for this area. Sightings of this species appear to be increasing in frequency. Typically, population levels of mountain lions are associated with a healthy and widespread prey base distribution, usually mule deer. Both the analysis and decision areas contain large numbers of mule deer. The largest concentrations of mule deer winter/spring ranges are found on private lands adjacent to the Beartooth District.

Alterations of seasonal mule deer home ranges have potential to adversely impact mountain lion distribution within the analysis area. Approximately 50 acres of habitat alterations are potentially anticipated via Appendix B. This level of alteration would minimally effect mountain lion use and distribution within the decision area.

White-tailed Deer: Habitat for this species is contained along the drainage bottoms and aspen cover types within the decision area. These habitats, provide summer/fall home ranges for white-tailed deer. Winter/spring habitat within the decision area is extremely limited due to winter snow accumulations which renders forage unavailable. By far, the greatest extent of white-tailed deer summer/fall and winter/spring lies adjacent to the decision area on private land. Implementation of the exploration and development scenario, as detailed in Appendix A, would disturb approximately 25 acres of white-tailed deer habitat. This amount of disturbance is not anticipated to have a detrimental effect to white-tailed deer and their habitats within the decision area.

MIS and Other Wildlife Species

Ruffed Grouse: Distribution of this species parallels distribution of Aspen communities across the Beartooth Face. There currently exist approximately 4,000 acres of aspen within the decision area. Ruffed grouse populations are dependant on periodic disruption, resulting in regeneration of these aspen communities. As discussed in Appendix B, approximately 50 acres of habitat alteration is anticipated within the project area. Approximately 1/2 of this, or 25 acres, could take place in aspen cover types. This represents less than 1 percent of the aspen communities on the Beartooth Face experiencing any degree of modification. Additionally, once an aspen community is disturbed, it often regenerates, and provides required habitat components for Ruffed Grouse.

Activation of oil and gas activities in aspen communities may have a short term adverse effect. However, in the long term, regeneration of aspen through oil and gas disturbances may prove beneficial to ruffed grouse populations on the Beartooth District.

Northern Goshawk: Potential nesting habitat exists in essentially every management area. Suitable nesting habitat is comprised of lodgepole pine, spruce/fir, Douglas-fir and aspen cover types. Concerns relative to goshawk nesting habitat are similar to those described for boreal owls and black- backed woodpeckers, namely the fragmentation of forested areas as a result of timber harvest. As described earlier, approximately 50 acres may be altered as a result of oil and gas related activities. This level of impacts are considered relatively minor when viewed over the scope of the decision area.

Blue Grouse: Blue grouse populations are dependent on two major habitat components. This species typically winters at high elevation at or near timberline. Forage consists of spruce, alpine-fir, and douglas-fir needles. Suitable wintering habitat is found throughout all management areas which contain this component. Under alternatives 1 through 4a most of these areas would receive a NSO stipulation due to slopes in excess of 40 percent or fragile soils prone to mass failure. Additionally, Appendix B forecasts approximately 50 acres of disturbance within the decision area. All potential well locations are situated in low elevation areas where foraging habitat for this species is either limited in coverage, or nonexistent.

The other important habitat component is made up of woodland draws containing aspen, mountain maple, or other hardwood species adjacent to grass or sage brush cover types. These areas are utilized during breeding and brood rearing. This habitat component lies largely on private land adjacent to the decision area. Additionally, Appendix B forecasts approximately 50 acres of habitat alternation. This level of disturbance does not constitute a large scale impact to breeding/brood rearing habitats within this decision area. Impacts to blue grouse populations or habitats related to oil and gas activities are expected to be negligible.

Species Analyzed at the Alternative Level

Threatened and Endangered Species

Grizzly Bear: Effects of this project on grizzly bears were based on the application of stipulations by alternative for MS1 and MS2 habitats. Table 4.6 provides a summary of acres of MS1 and MS2 habitats by stipulation within the decision area.

Under Alternatives 1-4A, the MS1 and MS2 habitats are either not leased or leased with a no surface occupancy stipulation. Essentially there would be no effects of oil and gas exploration and development on grizzly bears in these habitats.

Under Alternative 5, MS1 areas would be leased with a timing limitation, and MS2 habitats would be leased under standard terms. Although direct effects could be mitigated under these stipulations, adverse indirect and cumulative effects could occur. Oil and gas exploration and development, current and proposed mining activities, and recreation use could adversely effect grizzly bears at a cumulative level.

Grizzly bears have been occasionally observed in the Absaroka-Beartooth Wilderness north of the Cooke City C Management Area. Although most of the decision area is not considered important for grizzly bears, highly suitable habitats do occur over the decision area. Most of these habitats lie at higher elevations bordering the Absaroka-Beartooth Wilderness. Habitats considered potentially important to bears (even if currently unoccupied) include whitebark pine, older seral spruce-fir, mesic alpine meadows, and mountain meadow. These habitats comprise a total of 26,990 acres within the decision area.

Under Alternatives 1-4A, most of these habitats would be unaffected by the project due to no lease, not available for leasing or no surface occupancy stipulations. As stated previously, no habitats in MS1 and MS2 habitats would be affected by these alternatives. Alternative 5 would lease 20,420 acres of these habitats. There are no anticipated direct or indirect effects of leasing these habitats as these areas are currently unoccupied. However, if bear populations expand into these habitats, effects could occur.

Gray Wolf: No confirmed sightings of gray wolves have been reported within or immediately adjacent to the decision area. As wolves are currently thought to be absent, no direct or indirect effects are anticipated on gray wolves as a result of project implementation.

However, the decision and analysis area are in close proximity to Yellowstone National Park. Wolf recovery efforts in the Park could result in wolves using a portion of the decision/analysis area for foraging and denning habitat. Oil and gas exploration and development activities could render habitats unsuitable for wolves by displacing their prey. These activities could also provide access into areas that are potential wolf habitat thereby increasing the propensity for human/wolf conflicts.

The decision area contains 30,310 acres that are considered concentration areas for moose and elk, and are also unroaded. For the most part, these areas are in close proximity to the Absaroka-Beartooth Wilderness or other large roadless areas that would afford wolves escape cover. As expected, most of the roaded areas are along drainage corridors or on gentle terrain in close proximity to the Forest boundary. These areas also support most of the white-tailed deer and mule deer habitat found on the District. The majority of habitat for these species is found off-Forest.

Alternatives were evaluated by determining potential effects of stipulations on big game core habitats that were located in unroaded areas. As big game concentration areas are a critical component of wolf habitat, effects on these species must also be considered. The reader is referred to those sections for specific information on deer, elk and moose.

Under Alternatives 1-3 and 4A, the majority of these habitats are protected by either no surface occupancy stipulations, are unavailable for leasing or are not leased. In addition, those big game core habitats not managed under these criteria are managed with timing limitations. Implementation of these alternatives would not significantly affect gray wolf reintroduction potential in the analysis area. Alternative 4 would manage core habitats for moose and elk using standard terms and timing limitations. Some displacement of elk and moose could occur, as well as increased human access into currently unroaded areas. If wolves eventually occupy the analysis and decision area, potential does exist for human/wolf conflicts. The effects of big game displacement and increased human access could limit wolf recovery in this portion of the Greater Yellowstone area.

Alternative 5 would manage big game core areas only under standard terms. Displacement of elk and moose could occur, and human access into currently unroaded areas would increase. Potential for conflicts between wolves and humans is likely if wolves were to reoccupy this portion of the historical habitat. Management areas which contain this potential habitat include B Little Rocky, C Meyers Creek, C Picket Pin, C Stillwater, C Line Creek, D Picket Pin, D Fishtail, D Line Creek, E Stillwater, G Fishtail, P Meyers Creek and R West Rock Creek.

All of these management areas would receive a lease notice for gray wolves. Under the terms of this Lease Notice, detailed surveys would be required at the time a APD is filed. Survey results would be used to address current occupancy, or how leasing would effect the potential for wolf recovery. Occupancy of the lease would not be permitted if these conflicted with wolf recovery efforts.

Additionally, all leases sold will have standard terms invoked. As previously discussed, threatened and endangered species are afforded what ever level of protection is required in order to not adversely effect the species. This may include precluding surface occupancy even if the lease is sold without a NSO stipulation if, in the judgement of the Forest Service, this measure is necessary to prevent unacceptable impacts to this particular species. It must be noted, however, that wolves must be present within the Decision Area in order to invoke the protection afforded the species by standard terms.

Bald Eagles: The decision and analysis area are considered marginal for nesting bald eagles due to the relatively high elevation of the area, lack of large riverine systems or lakes, and the lack of available conifer and riparian woodland habitats considered suitable for nesting.

Sporadic winter use has been documented along the major tributaries within the decision area including the Stillwater River, both the West and East Rosebud Creeks, and the Rock Creek drainages. The decision area contains approximately 3,540 acres that is considered suitable for winter foraging habitat. By far, the most suitable winter foraging habitats lie on private lands downstream of the decision area. Under Alternatives 1-4A, riparian habitats considered suitable for wintering bald eagles will be managed under stipulations that will protect surface resources. Alternative 5 would allow the leasing of 650 acres of these habitats, and could result in moderate effects on winter use within the decision area.

Under all alternatives, a lease notice will be applied to these management areas that requires a detailed survey at the time an Application for Permit to Drill (APD) is received. The intent of this survey would be to determine the extent habitats are used by bald eagles. Activities that would render these areas unsuitable as foraging habitat will be prohibited.

If nest sites are identified, guidelines in the Pacific Bald Eagle Recovery Plan will be followed. 1) An NSO stipulation will be applied to 1/4 mile radius of known and alternate nests. 2) Timing stipulations will be applied within 1/2 mile of the nest from February 1 through August 15.

Given the aforementioned Lease Notice survey requirements, it is anticipated that oil and gas exploration/development will not adversely affect the bald eagle or habitats used by bald eagles.

Peregrine Falcon: Within the decision area, approximately 31,300 acres of foraging habitat for the peregrine falcon exist. Both nesting and foraging habitats are dispersed widely over the decision area. This potential habitat lies within management areas B Bad Canyon, B Black Butte, B Butcher Creek, B Little Rocky, C Line Creek, C Palisades, C Picket Pin, C Stillwater, D Fishtail, D Palisades, E Stillwater, F East Rosebud, F West Rosebud, P Rock Creek, and R West Fork of Rock Creek. The Stillwater River drainage contains the better habitats due to the size of the drainage, potential nesting substrates and availability of high quality foraging habitat. This drainage also includes the historic nest site.

Potential effects include displacement of nest sites due to oil and gas related development activities, or the loss of foraging habitat through habitat alteration. Loss of foraging habitat is probably a minor concern. The relatively small loss of habitat from roads, oil and gas pads and pipelines (less than 50 acres) will not sufficiently alter habitats so as to render them unsuitable for foraging.

Under Alternatives 1, 2, 3, 4, and 4A, between 136,450 acres to 148,580 acres (77 percent to 83 percent) would be either not leased, made not available for leasing or leased with a no surface occupancy stipulation. Surface resources would be protected over a substantial portion of the area significantly limiting potential effects on peregrine falcons. Alternative 5 would lease 139,520 acres under standard stipulations.

A lease notice will be attached to each of the above management areas for peregrine falcons. Under the terms of the lease notice, a detailed survey will be required within each of these areas at the time an Application for Permit to Drill (APD) is received.

Additionally, all leases sold will have standard terms invoked. As previously discussed, threatened and endangered species are afforded whatever level of protection is required in order to avoid adverse effects to the species. This may preclude surface occupancy even if the lease is sold without a NSO stipulation if, in the judgement of the Forest Service, this measure is necessary in order to prevent unacceptable impacts to the particular species.

Sensitive Species

Harlequin Ducks: Approximately 100 miles of suitable habitat exists within the analysis area for harlequin ducks. Of this, approximately 67 miles occurs in the Absaroka-Beartooth Wilderness, while the remaining 33 miles exists within the decision area. Approximately 31 of the 33 miles of suitable habitat within the decision area is paralleled by roads that receive high levels of motor vehicle use. Additionally, these areas receive high levels of recreational (hiking, fishing, etc.) use during the breeding, nesting, and brood rearing seasons.

Habitats that may have historically supported populations of this species may have been largely rendered unsuitable for nesting and brood rearing. Perhaps the single largest impact to harlequin duck nesting and brood rearing habitat on the Beartooth District has been recreation use of the riparian areas. Heavy recreation use has been attributed to poor brood production on the Flathead National Forest. Portions of these riverine systems that are have dense shrub and tree bank cover may afford sufficient cover for nesting harlequin ducks. In Yellowstone National Park, harlequin duck pairs have been found nesting and rearing broods in close proximity to human use, where sufficient cover was available.

Oil and gas activities associated with exploration and development would not result in significant additional effects to this species within the decision area as compared with existing habitat conditions.

Under Alternatives 1-4a, lease stipulations will protect surface habitats potentially used by harlequin ducks. Alternative 5 may result in leasing habitat considered suitable for this species.

Under all alternatives, a lease notice will be attached requiring a detailed survey of potential habitats prior to exploration/development activities. If harlequin ducks are documented, site specific mitigation would be developed in to prevent impacts to this species. Mitigation may include a 1/4 mile buffer around the stream reach where use is documented.

Due to the application of the lease notice, and subsequent required surveys and mitigation, no direct or indirect effects would be anticipated due to selection of any of the alternatives.

Boreal Owl: Oil and gas exploration and development may alter forested habitats through pad development and road construction. Direct taking of the owl through accidental shooting, vehicle collisions and other human related activities is not anticipated as a problem because of the owls' behavioral patterns. Investigators have documented owls in the Cooke City area in close proximity to human habitation without apparent adverse effects to this species. Activities most likely to adversely effect this species are those that fragment or alter older seral stages of conifer habitats, such as extensive logging.

Most of the habitats considered suitable for boreal owl nesting habitat are at higher elevations, and not subject to high levels of human use. Timber harvest on the Beartooth District has not been a significant factor in the alteration of habitats over the District. Historically, fire suppression significantly altered stand structure and spatial distribution of boreal owl habitats. With fire suppression, large stands of pole size or smaller stands developed. These habitats are currently at risk for large stand replacement type fires that occurred in the Yellowstone Ecosystem in 1988.

Under Alternatives 1-4A, most suitable nesting habitat will be managed under stipulations that will not alter surface vegetation (no leasing, no surface occupancy, etc.). Only Alternative 5 would allow leasing within a majority of the habitats considered suitable for this species. Even with a reasonable foreseeable development (four wells) no more than 50 acres of forested habitat would be altered as a result of these activities over the entire lease area.

To insure protection of potential nest sites, a lease notice will require a survey of forested habitats prior to exploration or development. Nest sites located will be protected. Effects of the project under any alternatives is expected to have only minor effects on the boreal owl.

Black-backed Woodpecker: Oil and gas exploration and development may alter forested habitats through pad development and road construction. Access into areas currently undeveloped could also result in loss of snags that are nesting substrates for this species. Direct taking of the woodpeckers through through accidental shooting, vehicle collisions and other human related activity has not been documented as a concern for this species.

The nomadic nature of this species makes nest site management difficult. The retention and management of suitable habitat on a landscape basis should insure the protection of habitats for black-backed woodpeckers. Activities most likely to adversely effect this species are those that fragment or alter older seral stages of conifer habitats, such as extensive logging. On the Beartooth District, effects of timber harvest on black-backed woodpecker habitats has been minor.

Stand replacing fires may play a significant role in providing habitat for this species. Black-backed woodpeckers have been documented using burned stands for foraging, and adjacent unburned spruce/ subalpine fir stands for nesting. With the suppression of fire, foraging habitat may have declined for this species.

Under Alternatives 1-4A, most suitable nesting habitat will be managed under stipulations that will not alter surface vegetation (no leasing, no surface occupancy, etc.). Only Alternative 5 would allow leasing within a majority of the habitats considered suitable for this species. Even with a full-development scenario (4 wells) no more than 50 acres of forested habitat would be altered as a result of these activities over the entire lease area.

To insure protection of potential nest sites, a lease notice will require a survey of forested habitats prior to exploration or development. Nest sites located will be protected. Effects of the project under any alternative is expected to have only minor effects on black-backed woodpeckers.

Lynx: Although lynx have not been documented in the analysis area, suitable habitats do exist that could support lynx. Habitats considered suitable for foraging (early seral lodgepole pine and spruce/fir) and denning (late seral spruce/fir) are spaced over much of the the decision area at the higher elevations. Of the 58,540 acres of available lynx habitat, 10,010 acres is considered suitable for denning, and an additional 48,530 acres is considered suitable for foraging.

Direct effects such as habitat alteration or removal are expected to have minor effects on the availability and distribution of lynx foraging and denning habitat. As detailed in Appendix B, only 50 acres of ground within the decision area will foreseeably be disturbed.

A more significant concern relative to lynx is accessing areas that are currently unroaded, and the subsequent effects of trapping and human disturbance on these areas.

Under Alternatives 1-3 and 4A, most of habitats considered suitable for lynx denning and foraging habitat would be protected by no leasing, not available for leasing, or no surface occupancy stipulations. These alternatives would have minor indirect and cumulative effects on lynx habitats.

Alternative #4 would lease portions of lower elevation foraging habitat, but would maintain the majority of denning habitat under no surface occupancy stipulations. Minor effects could occur under this alternative.

Alternative 5 would lease portions of suitable denning and foraging habitat under standard stipulations (45,620 acres). Although significant direct effects are not anticipated, lynx could become more vulnerable taking by hunting and trapping.

Under all alternatives, a lease notice will be attached to all management areas that contain suitable denning or foraging habitat. Under the terms of the lease notice, detailed habitat surveys would be required if an ADP is filed. Survey results would be used to determine how the lease would effect the connectivity of lynx habitats within and adjacent to the decision area, and potential effects on lynx from trapping or hunting. Occupied habitats would be mitigated to minimize the effects of exploration and development on lynx denning and foraging habitat.

Townsend's Big Eared; Spotted; and Pallid Bats: Habitats required to support these species of bats include limestone palisade formations that occur within the decision area. An estimated 9,480 acres are potentially suitable for bat hibernacula or roost sites. Occupied habitats would be a much smaller subset (caves, crevices, etc.) within the palisades type habitats. Palisades habitats are extremely steep (greater then 40 percent slopes). Due to slope stipulations, direct effects on these types of habitats are unlikely. Likewise, because of the low amount of surface disturbance anticipated, direct effects on foraging habitats are expected to be minimal.

Activities related to oil and gas exploration and development could have indirect and cumulative effects on potential bat roosts and hibernacula. Many species of bats are extremely sensitve to noice and human activities in close proximity to maternity roosts and winter hibernacula. Such disturbances can cause abandonment of sites.

Under Alternative 1 through 4A most of these habitats would be unavailable for leasing, not leased, or leased with no surface occupancy stipulations. Indirect and cumulative effects under these alternatives are expected to be minor.

Alternative 5 would lease most of this habitat under standard terms. Via standard term leasing, two levels of wildlife resource protection may be provided. A drill program may be delayed or deactivated for up a 60 day period. Also, standard term leasing allows for the relocation of a specific well site up to 200 meters. These species of bats may use these habitats for periods of time exceeding 60 days, and may not be protected adequately by this stipulation. The relocation of a well site by 200 meters may be sufficient for removing the disturbance activity from within suitable hibernacula or maternity roost sites. This alternative has the potential to adversely effect these bat species.

A lease notice will be attached to management areas which contain suitable habitat for these species. Under the terms of a lease notice, a detailed survey for these three bat species would be required if an APD is filed. If these bats are documented to occur near the well location, site specific mitigation would be developed to prevent or minimize impacts to these species.

White-tailed Prairie Dogs: Approximately 50 acres of occupied habitat for this species exist within the Decision Area. All of this occupied habitat is contained within management area C Line Creek, adjacent to the Wyoming border.

Selection of alternative #1 would preclude leasing the the occupied white-tailed prairie dog habitat. Under this alternative, the entire decision area would not be leased. Selection of this alternation would be anticipated to prevent or minimize direct and indirect effects to white-tailed prairie dogs in this management area.

Selection of Alternatives #2 through #4, the area of white-tailed prairie dog habitat would be leased with a NSO stipulation. No ground disturbances associated with exploration activities would be permitted. Selection of Alternative #4a would lease approximately 10 percent of this habitat with a NSO stipulation, the remaining 90 percent of the area would be leased with a TL stipulation. Under Alternative #5, the area which contains this habitat would receive a TL stipulation due to Line Creek Elk winter/spring range considerations. Under the terms of the lease, occupation of this area would be prevented from November 30 to June 15 each year.

Selection of any alternative which permits occupation of the land surface would have a lease notice in place for this species. Under the terms of a lease notice, a detailed survey would be required for this species. As a result of the site specific survey, mitigation measures would be developed which would prevent or minimize effect to white-tailed prairie dogs in this management area if an APD were filed.

Big Game Species

Mule Deer: Important Mule Deer winter/spring ranges exist within the decision area. These areas are located with management areas "D" Picket Pin and "T" Scenic Byway, and "B" Bad Canyon. The effects to the winter/spring home range contained in "B" Bad Canyon are discussed in chapter 4.2 for this management area. The other two management areas contain approximately 8,000 acres of mule deer winter/spring home range.

Selection of Alternative 1 would preclude leasing the entire decision area. Therefore, no direct or indirect effects would be anticipated. Alternative 2 would not lease approximately 25 percent of these home ranges, and the remaining 75 percent would be leased with a NSO stipulation.

Selection of Alternative 3 would lease these areas with 80 percent NSO and 20 percent TL stipulations.

Alternative 4 would lease these winter/spring ranges with four levels of resource considerations. Approximately 75 percent of these areas would be leased with NSO, ten percent would be leased with a TL stipulation, five percent would be leased with a CSU stipulation, and finally ten percent would be leased with standard terms.

Alternative 4a would make ten percent of these home ranges not available for leasing. The remaining portions of winter/spring ranges would receive a variety of treatments. Approximately 50 percent would be leased with with a NSO stipulation, 20 percent would receive a TL stipulation, 5percent would be leased with a CSU stipulation, and finally 15 percent would receive standard terms.

Alternative 5 would lease all mule deer winter/spring ranges with various levels of resource considerations. Approximately five percent would be leased with a NSO stipulation, 10 percent would be leased with a TL stipulation, 25 percent would be leased with a CSU stipulation, and the remaining 60 percent would receive standard terms.

It is anticipated that selection of alternative 5 has the potential to adversely effect mule deer winter/spring home ranges.

Black Bear: Occurrence of black bears within the decision area is widespread. All areas within the administrative boundaries of the Beartooth District are considered potential bear habitat during some portion of the year. However, specific areas which provide foraging opportunities for white bark pine nuts and berries are seasonally important for the bears survival.

The most serious impact to black bears is the potential for increased human access within occupied habitat. Concerns relative to black bear are similar to those expressed for lynx. Accessing currently unroaded areas could result in increased human disturbance and mortality from hunting. As discussed in Appendix B, approximately 50 acres of disturbance is forecasted to take place within the Beartooth District. Large scale habitat alteration is not reasonably foreseeable.

Selection of Alternative 1 would preclude leasing in the entire decision area. Selection of this alternative would not be expected to have adverse direct and indirect effects to black bears within the decision area.

Selection of Alternative 2 would lease important foraging areas (white bark pine nut and berry producing) with a variety of resource considerations. For white bark pine nut production areas, approximately 25 percent of these areas would not be leased, 50 percent of these areas would be leased with a NSO stipulation, 20 percent of these areas would be leased with a TL stipulation, and five percent of these areas would receive standard terms. Additionally, areas which provide berry production would similarly be leased with a variety of resource considerations. Approximately five percent of these areas would not be leased, 85 percent would be leased with a NSO stipulation, and finally ten percent would be leased with standard terms.

Selection of Alternative 3 would lease important foraging areas (white bark pine nut and berry producing) with a variety of resource considerations. For white bark pine nut production areas, approximately 80 percent of these areas would be leased with a NSO stipulation, 10 percent of these areas would be leased with a TL stipulation, 5 percent of the area would be leased with a CSU, and 5 percent of these areas would receive standard terms. Additionally, areas which provide berry production would similarly be leased with a variety of resource considerations. Approximately 80 percent would be leased with a NSO stipulation, 10 percent of the areas would be leased with a TL stipulation, and finally 10 percent of the areas would be leased with standard terms.

Selection of Alternative 4 would lease important foraging areas (white bark pine nut and berry producing) with a variety of resource considerations. For white bark pine nut production areas, approximately 75 percent of these areas would be leased with a NSO stipulation, 5 percent of these areas would be leased with a CSU stipulation, 20 percent of the area would be leased with standard terms. Additionally, areas which provide berry production would similarly be leased with a variety of resource considerations. Approximately 50 percent would be leased with a NSO stipulation, 10percent of the area would be leased with a TL stipulation, 25 percent of this area would receive a CSU stipulation, and finally 10 percent of the area would be leased with standard terms.

Selection of Alternative 4A would lease important foraging areas (white bark pine nut and berry producing) with a variety of resource considerations. For white bark pine nut production areas, approximately 35 percent of these areas would not be administratively available, 5 percent would not be leased, 50 percent of these areas would be leased with a NSO stipulation, and finally approximately 10 percent of these areas would be leased with standard terms. Additionally, areas which provide berry production would similarly be leased with a variety of resource considerations. Approximately 30 percent would not be administratively available, less the 5 percent would not be leased, 55 percent would be leased with a NSO stipulation, less than 5 percent of the area would be leased with a TL stipulation, and finally 10 percent of the area would be leased with standard terms.

Selection of Alternative 5 would lease important foraging areas (white bark pine nut and berry producing) with a variety of resource considerations. For white bark pine nut production areas, approximately 5 percent of these areas would be leased with a NSO stipulation, 10 percent of these areas would be leased with a TL stipulation, 10 percent would be leased with a CSU stipulation, and finally 75 percent of the area would be leased with standard terms. Additionally, areas which provide berry production would similarly be leased with a variety of resource considerations. Approximately 5 percent would be leased with a NSO stipulation, 10 percent of the area would be leased with a TL stipulation, 10 percent of this area would receive a CSU stipulation, and finally 75 percent of the area would be leased with standard terms.

It is anticipated that adverse effects could potentially take place under selection of Alternative 5.

Pronghorn Antelope: The Decision drea arovides approximately 200 acres of year long habitat for pronghorn. The vast majority of the home range used by antelope occurs east of the decision area on private and BLM land (approximately 200,000 acres). The habitat contained in the decision area lies wholly within Line Creek management area "C". Under Alternatives 1 through 4, this entire management area would either not be leased or experience NSO leasing. In either case, ground disturbances associated with exploration activities would not take place. Alternative 4A would lease antelope home range with approximately 50 percent NSO and 50percent TL stipulations due to over lap with Line Creek Elk winter/spring ranges. This TL stipulation would prevent occupation of this area from November 30 to July 1 each year. Alternative 5 would lease this area with a TL stipulation for the Line Creek Elk's winter/ spring range. Surface occupation would be precluded from November 30 to July 1 each year.

Effects of the oil and gas exploration/development on pronghorn under all alternatives are expected to be minor.

Other Wildlife Species

Wolverine and Pine Marten: Pine marten are probably common throughout the decision area particularly in lodgepole pine and spruce/fir cover types. Suitable habitat for wolverine are also found over most of the decision area, although individual animals have been only rarely documented. Summer habitat for this species occurs in higher elevation areas with a juxtaposition of dense late seral spruce/fir stands for denning and a variety of alpine and sub-alpine habitats for foraging. Winter habitats are associated with riparian woodlands and conifer habitats at lower elevations.

As with other free ranging carnivores such as the grizzly bear, gray wolf, lynx, and black bear; the greatest concern regarding wolverine and marten is providing access to currently unroaded areas.

Under Alternatives 1 through 3 and 4A, most of habitats considered suitable for both species is protected by no leasing, no surface occupancy or timing limitations. Impacts from oil and gas exploration/ development would likely be negligible under these alternatives.

Alternative 4 would lease portions of lower elevation foraging habitat for wolverines. Riparian associated habitats would managed primarily under "no surface occupancy". Effects of exploration/development under this alternative could have minor effects on wolverine and marten. Although potential exists for some development on higher elevation habitats, the effects are expected to be relatively minor.

Alternative 5 would lease portions of suitable habitat for both species under standard stipulations. Implementation of this alternative could increase the susceptibility of martens to trapping efforts.

A lease notice will be attached to all management areas that contain suitable habitat for these species that requires detailed surveys for these species. If marten or wolverine are documented, specific mitigation would be developed to prevent or minimize impacts to these species.

Summary

Table 4.6 displays the number of acres of selected animal habitat and the stipulations used. All leases have standard terms attached, but for comparison purposes, the standard terms acres shown are those acres where no other stipulations are applied.

Table 4.6
Issue 2, Acres by Stipulation by Alternative

Acres by Stipulation	1	2	3	4	4A	5
Yellowstone Cutthroat Trout						
Verified						
No Leasing (NL)	210					
No Surface Occupancy (NSO)		210	210	210	210	
Standard Terms (ST)						210
Presumed						
No Leasing (NL)	670	310			210	
Not Available (NA)					240	
No Surface Occupancy (NSO)		300	530	340	90	180
Timing Limitations (TL)			70	120	50	10
Controlled Surface Use (CSU)				70		220
Lease Notice (LN)		60	70	140	80	260
Golden Eagle Nest						
No Leasing (NL)	4,380					
No Surface Occupancy (NSO)		4,380	1,290	920	1,290	510
Timing Limitations (TL)				370		
Grizzly Bear Habitat						
MS 1						
No Leasing (NL)	2,740	2,740			2,740	
No Surface Occupancy (NSO)			2,740	2,740		100
Timing Limitations (TL)						780
Standard Terms (ST)						1,240
MS 2						
No Leasing (NL)	4,360				2,890	
No Surface Occupancy (NSO)		4,360	4,360	4,360	1,470	380
Standard Terms (ST)						3,980
Elk Winter/Spring Range						
No Leasing (NL)	13,150	4,860				
Not Available (NA)		800	800	800	3,800	
No Surface Occupancy (NSO)		7,440	11,420	11,100	6,440	11,840
Timing Limitations (TL)		50	930	1,250	2,910	1,130
Standard Terms (ST)						180

Acres by Stipulation	1	2	3	4	4A	5
Elk Summer/Fall Range						
No Leasing (NL)	26,150	8,390				
Not Available (NA)					9,180	
No Surface Occupancy (NSO)		17,570	21,150	17,080	9,050	760
Timing Limitations (TL)		10	5,000	400	7,920	4,380
Controlled Surface Use (CSU)						2,980
Standard Terms (ST)				8,670		18,030
Moose Winter/Spring Range						
No Leasing (NL)	13,630					
Not Available (NA)					500	
No Surface Occupancy (NSO)		13,360	8,330	5,800	5,980	730
Timing Limitations (TL)			5,300	5,290	6,920	310
Controlled Surface Use (CSU)				70		
Standard Terms (ST)				2,470	230	12,590
Moose Summer/Fall Range						
No Leasing (NL)	1,170					
Not Available (NA)					430	
No Surface Occupancy (NSO)		1,170	850	830	420	70
Timing Limitations (TL)			320	20		
Standard Terms (ST)				320	320	1,100
Mule Deer Winter/Spring Range						
No Leasing (NL)	1,870					
No Surface Occupancy (NSO)		1,830	1,830	1,830	1,830	
Timing Limitations (TL)		40	40	10	10	
Standard Terms (ST)				30	30	1,870
Big Horn Sheep Winter/Spring Range						
No Leasing (NL)	11,210	4,860			640	
Not Available (NA)					3,440	
No Surface Occupancy (NSO)		6,350	10,900	10,380	6,490	570
Timing Limitations (TL)			310	830	640	840
Controlled Surface Use (CSU)						3,480
Standard Terms (ST)						6,320
Mountain Goat Yearlong Home Ranges						
No Leasing (NL)	4,170					
Not Available (NA)					1,370	
No Surface Occupancy (NSO)		4,170	4,170	4,170	2,770	140
Timing Limitations (TL)						2,600
Standard Terms (ST)					30	1,430

Cumulative Effects

Cumulative effects are defined as " the impact to the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

The decision area currently is relatively undeveloped. Actions which have cumulatively impacted the area include livestock grazing, recreational activities, small scale timer harvesting, and mineral exploration and extraction activities. All these activities have the potential to impact fish and wildlife population levels or distribution if they occur, unmitigated, in occupied home ranges.

The cumulative effects discussion for the entire decision area will be based on use of the Reasonably Foreseeable Development (RFD) scenario discussed in Appendix A and B.

Alternative 1

All RFD locations would not be activated. Therefore there are no cumulative effects to fish or wildlife resources which would be attributed to oil and gas activities due to selection of this alternative.

Alternative 2

Dean Dome: Selection of this alternative would lease the area in which this RFD is located with a NSO stipulation. The well site would not be activated. Therefore there are no cumulative effects to fish or wildlife resources which would be attributed to oil and gas activities due to selection of this alternative.

Red Lodge Creek: Selection of this alternative would lease the area in which this RFD is located with a NSO stipulation. The hypothetical well location would not be activated. Therefore, no cumulative effects to fish or wildlife resources would be attributed to oil and gas activities due to selection of this alternative.

Silver Run: Selection of this alternative would not permit activation of this RFD location since the management area in which this site is located would not be leased. The well site would not be activated. Therefore no cumulative effects to fish or wildlife resources resulting from oil and gas activities would take place due to selection of this alternative.

Lake Fork: Selection of this alternative would not permit activation of this RFD location since the management area in which this site is located would not be leased. Therefore there are no cumulative effects to fish or wildlife resources resulting from oil and gas activities that would take place due to selection of this alternative.

Alternative 3

Dean Dome: Selection of this alternative would lease the area surrounding this RFD location with a TL stipulation due to the use of the area by the McDonald Basin Moose herd during the winter/spring portion of the year. Under the terms of the lease, activation of this site would be precluded from October 15 through June 15 each year.

> **Moose:** Selection of Alternative 3 would lease approximately 3,250 acres of the winter/spring home range, used by the McDonald Basin Moose, within the decision area, with a NSO stipulation. The remaining 4,960 acres of this seasonal home range would be leased with a TL stipulation which would prevent occupation of this area by oil and gas activities from October 15 to June 15 each year.
>
> Additionally, the majority (9,600 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. Therefore, selection of Alternative 3 would not be anticipated to cumulatively effect the McDonald Basin Moose herd during their occupation and use of this seasonal home range.

Red Lodge Creek: Selection of this alternative would lease the area surrounding this RFD location with a TL stipulation due to the use of the area by the Red Lodge Creek Moose herd during the winter/spring portion of the year. Under the terms of the lease, activation of this site would be precluded from October 15 through June 15 each year.

> **Moose:** Selection of Alternative 3 would lease approximately 40 acres of the winter/spring home range, used by the Red Lodge Creek Moose herd, within the decision area, with a NSO stipulation. The remaining 580 acres of this seasonal home range would be leased with a TL stipulation which would prevent occupation of this area by oil and gas activities from October 15 to June 15 each year.
>
> Additionally, the majority (4,210 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. Therefore, selection of Alternative 3 would not be anticipated to cumulatively effect the Red Lodge Creek Moose herd during their occupation and use of this seasonal home range.
>
> **Elk:** The area surrounding this RFD location serves as a migration corridor connecting the Luther Elk herds winter/spring home range and the summer/fall home range. It is anticipated that the TL stipulation applied to this area due to moose consideration would be sufficient to protect the use of the Luther Elk herds migration corridor during both late spring and late fall periods of use.

Silver Run: Selection of alternative 3 would prevent activation of this RFD location, since the entire management area would be leased with a NSO stipulation. Therefore, no cumulative effects would result from oil and gas activities.

Lake Fork: Selection of this alternative would lease the area where this RFD site is located with a NSO stipulation. Therefore, the well would not be activated. No cumulative effects would result from oil and gas activities.

Alternative 4

Dean Dome: Selection of this alternative would lease the area surrounding this RFD location with standard terms. Under the terms of standard term lease, two levels of mitigation are available to wildlife resources, oil and gas activities can either be delayed 60 days or the drill location can be move 200 meters.

> **Moose:** Selection of Alternative 4 would lease approximately 2,970 acres of the McDonald Basin Moose winter/spring home range, within the decision area, with a NSO stipulation, approximately 200 acres would be leased with a TL stipulation due to other resource overlap, approximately 20 acres would be leased with a CSU stipulation, and finally, the remaining 5,020 acres would be leased with standard terms.
>
> Additionally, the majority (9,600 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. However, most of the winter/spring home range used by the McDonald Basin herd within the decision area would be leased with standard terms. Therefore, selection of Alternative 4 would be anticipated to cumulatively effect the McDonald Basin Moose herd during their occupation and use of the seasonal home range within the decision area.

Red Lodge Creek: Selection of this alternative would lease the area surrounding this RFD location with standard terms. Under the terms of standard term lease, two levels of mitigation are available to wildlife resources, oil and gas activities can either be delayed 60 days or the drill location can be move 200 meters.

> **Moose:** Selection of Alternative 4 would lease approximately 40 acres of the Red Lodge Creek Moose winter/spring home range, within the decision area, with a NSO stipulation. The remaining 580 acres of this seasonal home range would be leased with standard terms.
>
> Additionally, the majority (4,210 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. However, most of the winter/spring home range used by the Red Lodge Moose herd within the decision area would be leased with standard terms. Therefore, selection of Alternative 4 would be anticipated to cumulatively effect the Red Lodge Creek Moose herd during their occupation and use of the seasonal home range within the decision area.
>
> **Elk:** This well location is situated in a migration corridor which connects the Luther Elk winter/spring and summer/fall home ranges. Under this alternative, the area surrounding this RFD location would be leased with standard terms. Occupation of this area by both oil and gas activities and elk would be anticipated to result in a shift of migration corridor use patterns. Impacts to the Luther Elk herd would vary depending on the length of time it took to establish use of a new migration corridor. Selection of Alternative 4 would most likely have an adverse cumulative effect on the Luther Elk herd and their historic use of this area.

Silver Run: Selection of this alternative would activate this RFD well location. However, no cumulative effects to wildlife resources would be anticipated since currently no wildlife makes extensive use of the area.

Lake Fork: Selection of this alternative would activate this RFD location, The area where this hypothetical site is located would be leased with standard terms.

> **Cutthroat Trout:** Activation of this well site would require a detailed survey for the presence of Yellowstone cutthroat trout. Construction or siting of the drill pad would be designed in order to minimize potential for adverse effects to the this species. However, cumulative effects to trout could still take place due to spillage of drilling fluids or chemicals into either the Lake Fork or Main Fork of Rock Creek. Therefore, activation of this site has the potential to cumulatively impact trout in the streams, which lie adjacent to this RFD location.

Alternative 4A

Dean Dome: Selection of this alternative would lease the area surrounding this RFD location with a TL stipulation due to the use of the area by the McDonald Basin Moose herd during the winter/spring portion of the year. Under the terms of the lease, activation of this site would be precluded from October 15 through June 15 each year.

Moose: Selection of Alternative 4a would prevent leasing approximately 430 acres of winter/spring home range used by the McDonald Basin Moose herd. Selection of this alternative would lease approximately 1,870 acres of the winter/spring home range within the decision area with a NSO stipulation. The remaining 5,910 acres of this seasonal home range would be leased with a TL stipulation which would prevent occupation of this area, by oil and gas activities from October 15 to June 15 each year.

Additionally, the majority (9,600 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. Therefore, selection of alternative 4a would not be anticipated to cumulatively effect the McDonald Basin Moose herd during their occupation and use of this seasonal home range.

Red Lodge Creek: Selection of this alternative would lease the area surrounding this RFD location with a TL stipulation due to the use of the area by the Red Lodge Creek Moose herd during the winter/spring portion of the year. Under the terms of the lease, activation of this site would be precluded from October 15 through June 15 each year.

Moose: Selection of alternative 4a would lease approximately 40 acres of the Red Lodge Creek Moose winter/spring home range, within the decision area, with a NSO stipulation. The remaining 580 acres of this seasonal home range would be leased with a TL stipulation which would prevent occupation of this area, by oil and gas activities from October 15 to June 15 each year.

Additionally, the majority (4,210 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. Therefore, selection of Alternative 4a would not be anticipated to cumulatively effect the Red Lodge Creek Moose herd during their occupation and use of this seasonal home range.

Elk: Same cumulative effects as discussed under Alternative 3.

Silver Run: Selection of this alternative would prevent activation of this RFD location. Under this alternative, the entire management area in which this site is located would administratively be unavailable for leasing. No cumulative effects related to oil and gas activities would be anticipated.

Lake Fork: Selection of this alternative would prevent activation of this RFD location. Under this alternative, the entire management area in which this site is located would be administratively unavailable for leasing. No cumulative effects related to oil and gas activities would be anticipated.

Alternative 5

Dean Dome: Selection of this alternative would lease the area surrounding this RFD location with standard terms. Under the terms of standard term lease, two levels of mitigation are available to wildlife resources, oil and gas activities can either be delayed 60 days or the drill location can be move 200 meters.

Moose: Selection of Alternative 5 would lease approximately 740 acres of the McDonald Basin Moose winter/spring home range, within the decision area, with a NSO stipulation. The remaining 7,470 acres would be leased with standard terms.

Additionally, the majority (9,600 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. However, most of the winter/spring home range used by the McDonald Basin herd within the decision area would be leased with standard terms. Therefore, selection of Alternative 5 would be anticipated to cumulatively effect the McDonald Basin Moose herd during their occupation and use of the seasonal home range within the decision area.

Red Lodge Creek: Selection of this alternative would lease the area surrounding this RFD location with standard terms. Under the terms of standard term lease, two levels of mitigation are available to wildlife resources, oil and gas activities can either be delayed 60 days or the drill location can be move 200 meters.

Moose: Selection of Alternative 5 would lease all 620 acres of winter/spring home range used by the Red Lodge Creek Moose herd with standard terms.

Additionally, the majority (4,210 acres) of defined winter/spring home range used by this herd is located outside of the project area, on private property. Land use trends within this area are not foreseen to change within the planning window of this analysis. However, since all of the winter/spring home range used by the Red Lodge Moose herd within the decision area would be leased with standard terms, selection of Alternative 5 would be anticipated to cumulatively effect the Red Lodge Creek Moose herd during their occupation and use of the seasonal home range within the decision area.

Elk: Same cumulative effects as discussed under Alternative 4.

Silver Run: Same cumulative effects as discussed under Alternative 4.

Lake Fork: Same cumulative effects as discussed under Alternative 4.

Possible Conflicts With Plans and Policies of Other Jurisdictions

There are no known conflicts with the plans and policies of other jurisdictions.

Probable Environmental Effects That Cannot be Avoided

Areas with either a No Lease, No Surface Occupancy, or Timing Limitation should not experience large scale environmental effects. Areas leased with a CSU stipulation would be anticipated to experience unavoidable environmental effects. Areas leased with standard terms may or may not experience unavoidable environmental effects depending on what wildlife species inhabits the area. Threatened and Endangered Species would not experience impacts due to implementation of standard terms. All non Threatened and Endangered Species could experience unavoidable environmental effect under standard lease terms.

Relationship Between Short Term Use and Long Term Productivity

Commitment of surface resources to oil and gas exploration, development, and production may have a short term (<50 years) impacts on fish, wildlife and the public's use of the area. However, since reclamation would be required, the area would eventually return to approximately the predevelopment condition. Level of use by fish, wildlife, and the public would be expected to return to predisturbance levels. Therefore, it is anticipated that no long term (>50 year) productivity would be sacrificed.

Irreversable and Irretrievable Commitments of Resources

There are no known irreversible and irretrievable commitments of resources. Implementation of oil and gas related activities will have short term fisheries or wildlife impacts. Once the disturbance factor is removed or eliminated, predisturbance conditions and resource utilization patterns would reestablish themselves.

Consistency With Forest Plan

Alternative 4 is fully consistent with the Forest Plan. Any alternative which deviates from the stipulations applied in Alternative 4 is not consistent with the Custer National Forest Land and Resource Management Plan.

4.1.4 ISSUES #1 AND #2 ECOSYSTEM INTEGRITY - BIODIVERSITY

Direct and Indirect Effects

Unique Plant Communities: Activities under the full-scale (four wells) RFD scenario would not eliminate any plant communities or cover types from the area. However riparian communities such as mountain meadows, streamsides, and wet alpine areas, as well as whitebark pine and krummholtz communities, which are all limited in the decision area, could be reduced by construction activities in some management areas.

Sensitive Plants and Species of Concern: Surveys for sensitive species and species of concern will be conducted prior to ground-disturbing activities within potential habitats. Even under standard terms (ST) the operator can be required to move a proposed well pad site up to 200 meters (about ⅛ mile) to protect sensitive species. This should adequately protect most sensitive species since they are generally restricted to very small site-specific habitats.

Landscape, Ecosystem, and Plant Community Processes: The effects of oil and gas related activities on landscape, ecosystem, and plant community processes are minor compared to factors such as freezing, thawing, wind, fire, drought, grazing, and other human intervention. These all affect species interaction, energy flow, and nutrient cycling. Fragmentation of linkages, connectedness of habitats and cycles, or elements important to these functions, can cause loss of stability in the system and affect the movement of plants and animals between patches of habitat.

Biological Diversity - Landscapes: Continued change in biological composition is anticipated. Changes caused by oil and gas development over the area (50 acres) and over time (15 years) are expected to be small compared to changes from other factors that have occurred over the last 100 years. However, decreases in abundance of certain plant communities and species, fragmentation of habitats, and displacement of wildlife species may occur.

Roads and developments of any kind on the Line Creek Plateau and adjacent forested slopes would detract from its value as a corridor, and movement of both large and small animals could be disrupted. Addition of the Line Creek Plateau to the preserves created by the Absaroka-Beartooth Wilderness and the Meeteetse Spires Preserve would create an undisturbed corridor between these two areas. This larger preserve would enhance biological diversity.

4.1.5 ISSUE #3 AESTHETICS

Visual Resources

Direct and Indirect Effects

Introduction: Analysis of the impacts of oil and gas development on visual resources is based on historical and known effects from such activities (such as effects from road construction and use). The change to the existing visual condition will be described along with a determination as to whether or not the visual quality objectives (VQO) are met in each alternative.

In some cases, entire management areas or portions of management areas will not be leased. In some alternatives, portions of management areas will be stipulated No Surface Occupancy (NSO). In these situations, there will be no effect on the visual resource. The environmental consequences described in Section 4.2 will only address the situations with anticipated surface occupancy and disturbance.

Effects Common Among the Alternatives

This discussion holds for all alternatives except Alternative A and 1 (No Leasing), when there would be no activity. The activities most likely to have a significant visual impact are road construction, exploratory drilling, field development and production. Construction and exploratory drilling are likely to cause the most significant change, while development and production impacts are longer lasting. Typical oil and gas development activities are explained in detail in Appendix C.

For drilling, roads are constructed to the site, and the drilling rig is put in place. Until the well is completed and the drilling rig removed, there could be as many as thirty to forty semi-truckloads of traffic per day. Drilling continues seven days a week, 24-hours a day, and the 120-feet-high oil derrick will be in place and operating 60 days or longer. If the drilling is successful, the derrick will be removed and a pumping unit or "Christmas tree" is installed. Pumping units range from twelve to fourteen feet high, and the Christmas tree can range from four to eight feet high. The visual impact of development would be greatly reduced by the use of Christmas trees, but they will only work if the reservoir pressure is sufficient to cause the well to flow naturally. A treater and storage tanks are also needed for either production method. Diagrammatic sketches of a Christmas tree and a pumping unit are shown in Appendix C.

4.1.6 ISSUE #4 RECREATION

Direct and Indirect Effects

The different acreages leased with various stipulations will change the direct and indirect effects on recreation, by alternative. Least impacts would be expected from Alternatives 1 and 2, and the greatest effect would be from Alternative 5. Even under Alternative 5, the maximum area disturbed would be 50 acres over a 15-year period.

Areas unleased or leased with an NSO stipulation would have no adverse direct and indirect effects to recreation opportunities. Timing limitation stipulations provide some mitigation aimed at oil and gas activities avoiding recreation areas, including campgrounds, picnic areas, trails and trailheads, during peak visitation periods. However users to these areas after the peak visitation periods would not experience the traditional recreation expectations. Land leased with a CSU stipulation can have some ground disturbance, and could result in visitors not having the traditional recreation experience. Mitigation by buffering recreational areas could decrease the visual and audible effects of exploration, development, and production. Mitigation such as painting oil and gas facilities earth tones or other blending colors, placing mufflers on motors, or requiring downhole motors (to reduce noise), would reduce noise effects. Standard lease terms could result in loss of the traditional recreation experience, and increased vehicle traffic and people, including project employees and families, would make recreation areas more crowded.

Table 4.7

Issue 3 & 4, Acres by Stipulation by Alternative

Acres by Stipulation	1	2	3	4	4A	5
Slopes >40 percent						
No Leasing (NL)	73,780	21,970				
Not Available (NA)		480	480	480	16,840	
No Surface Occupancy (NSO)		51,330	73,300	73,300	56,940	960
Timing Limitations (TL)						5,270
Controlled Surface Use (CSU)						17,440
Standard Terms (ST)						50,110
Campgrounds (Sites)						
No Leasing (NL)	310	170				
Not Available (NA)					310	
No Surface Occupancy (NSO)		140	310	310		310
(Buffer Surrounding Site 0.25 Mi.)						
No Leasing (NL)	1,910	750				
Not Available (NA)					1,910	
No Surface Occupancy (NSO)		1,160	490	310		370
Timing Limitations (TL)			1,420	1,600		
Standard Terms (ST)						1,540
Visual Corridors**						
No Leasing (NL)	4,430	3,430				
Not Available (NA)					2,360	
No Surface Occupancy (NSO)		970	4,370	3,880	2,000	60
Timing Limitations (TL)			30	70	20	
Controlled Surface Use (CSU)		30	30	480	30	3,400
Timing/Controlled Surface Use (TL/CSU)					20	
Standard Terms (ST)						970
Recreation Rivers						
No Leasing (NL)	9,100	6,560				
Not Available (NA)					7,370	
No Surface Occupancy (NSO)		2,540	7,590	4,260	1,090	1,150
Timing Limitations (TL)			1,400	1,470	320	
Controlled Surface Use (CSU)			110	1,220		4,220
Timing/ Controlled Surface Use (TL/CSU)					190	
Standard Terms (ST)				2,150	130	3,730
Trails						
No Leasing (NL)	30,640	12,820			1,770	
Not Available (NA)		80	80	80	12,570	
No Surface Occupancy (NSO)		16,160	27,830	25,100	13,210	1,810
Timing Limitations (TL)		80	1,130	800	840	3,600
Controlled Surface Use (CSU)		1,500	1,590	900		6,980
Standard Terms (ST)			10	3,760	2,250	18,250
Red Lodge Ski Area						
No Leasing (NL)	220					
Not Available (NA)					220	
No Surface Occupancy (NSO)		220	220	10		10
Standard Terms (ST)				210		210

Acres by Stipulation	1	2	3	4	4A	5
Organization Camps & Recreation Residents						
No Leasing (NL)	80	80				
Not Available (NA)					80	
No Surface Occupancy (NSO)			80	20		
Controlled Surface Use (CSU)				60		80
Wild Bill Picnic Area						
No Leasing (NL)	30	30				
Not Available (NA)					30	
No Surface Occupancy (NSO)			30	20		20
Controlled Surface Use (CSU)				10		10

**Visual Corridors are .25 mile buffers surrounding the boundary of Management Area F.

4.1.7 ISSUE #5 CULTURAL

Regulatory Framework

Cultural resources on public lands, including archaeological sites and historic properties, are protected by various laws and regulations dating as far back as the Antiquities Act of 1906. These laws and regulations include the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), American Indian Religious Freedom Act (AIRFA), the Native American Graves Protection and Repatriation Act (NAGPRA), and 36CFR Part 60 and 79. The Forest Service will comply with these laws and implementing regulations within the scope of the EIS.

Section 106 of the NHPA is the review process designed to ensure that historic properties are considered during Federal project planning and execution. It requires Federal Agencies to take into account the effects of their undertakings on National Register listed or eligible properties. This protection extends to properties not yet listed and those not yet discovered, but which may possess significance. National Register criteria (36 CFR 60.4) defines four categories of significance based upon "the quality of significance in American history, architecture, archaeology, and culture present in district, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or

B. Are associated with the lives of persons significant in our past; or

C. Embody the distinctive characteristic of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield information important in prehistory or history."

Within the decision area, there are 59 cultural resources, nine of which are eligible to or listed on the National Register of Historic Places and 44 of which are considered potentially eligible for nomination to the Register.

For this EIS, the Forest Service is undertaking a phased compliance approach to assure that the historic properties are not only considered at this early stage of planning (Section 800.3(c)) but also during development, when potential impacts to cultural resources are more readily definable. As part of this phased compliance, the Forest Service conducted an inventory of the areas that are composed of high to moderate potential for oil and gas occurrence. Information from this inventory was used to assess the type of sites most likely to be found in these areas, and to build a site location model to more accurately predict the extent of effects of leasing and development on the cultural resources.

Significant cultural resources sites will be preserved in place whenever possible. However, if avoidance of the resource is judged not prudent or feasible by the Forest Supervisor, the scientific or historic values of the site will be conserved in consultation with the State Historic Preservation Officer and Advisory Council on Historic Preservation, through proper scientific excavation, recordation, analysis and reporting. Standards of field work, data recovery, mitigation, analysis and personnel qualifications will reflect the most current Federal guidelines and Forest Service Policy.

Effects Common Among Alternatives

For all alternatives, a cultural resource inventory will be required when ground disturbing activities are proposed. This will benefit the Forest Service and the public by increasing the inventory of sites and acreage as prescribed in Section 110 of the National Historic Preservation Act (NHPA), and will improve our overall understanding of the prehistory and history of the area. The identification of additional traditional cultural properties and more information on the distribution and location of culturally important plant, animal, mineral and fossil resources might prove useful to Indian communities and individuals practicing a traditional way of life. Roads developed for oil and gas development could also increase or ease access to traditionally significant ceremonial or gathering areas. From the traditional cultural point of view, however, formal recording of traditional properties may also facilitate disrespectful treatment or inappropriate visitation.

Direct and Indirect Effects

According to Section 800.9 (a) of the NHPA an undertaking "has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register." Alteration to features of the property's location, setting, or use may be relevant depending on the property's significant characteristics. Further, Section 800.9 (b) of the act specifies, "..an undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, workmanship, feeling or association". These adverse effects include:

> The physical destruction or alteration of the property;
>
> Isolation of the property or alteration of the character of the setting when that character contributes to the property's qualification for the National Register;
>
> Or introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

These adverse effects could be in the form of direct, indirect, or cumulative impacts. Direct impacts are physical, and adversely affect the site or its setting. Construction activities would be the primary direct impact affecting sites or structures by either destroying or damaging the site, causing isolation from or alteration of its surrounding environment, or introducing visual, audible, or atmospheric elements that are out of character with the site and altering its setting.

Site avoidance through project redesign is a preferred preservation and protection procedure for managing the potential effects of a project on significant cultural resources. In cases where there are severe topographic constraints such as steep slopes and narrow valley bottoms that preclude this option, extensive mitigation through data recovery would be necessary to reduce the adverse effect of construction. This may apply to prehistoric sites located in this constrained setting.

Historic sites such as Camp Senia Historic District, Meyers Creek Ranger Station, Rock Creek Ranger Station, Line Creek Ranger Station, Mouat Mine, and Mountain View townsite, and Wild Bill Lake have significance in terms of their local history and their potential to contribute to our historical understanding of the area. They also retain a sense of setting from the time of their construction and use. These sites would be adversely affected by well pad and road development within view of the site, as well as from introduced smells, dust, and noise.

Adverse effects to setting have especially serious consequences for traditional cultural properties, since these sites were chosen for their pristine qualities and remoteness, among other things. Introduction of noise, well pads, roads, and smells may adversely affect the nine traditional cultural properties currently identified and their continued use.

Indirect effects would not immediately result in physical alteration of site or setting. A new access road into an area containing significant sites or structures would allow public access and exposure of the properties, and potentially decreasing the seclusion and quiet necessary for many of the traditional practices. Artifact collection or similar activities could physically alter the sites and may increase with more public access.

Alternative 1: The No Lease Alternative has little affect on the cultural resources due to the lack of ground disturbing activity or introduction of elements that may disturb the setting of the known historic sites and traditional cultural properties. One draw back is that the data base would not be increased by new sites discovered from which a better understanding of the prehistoric, historic and traditional use could be drawn. Although access to the more remote areas of the Beartooth would remain difficult for traditional use purposes, site collection and disturbance would not be increased.

Alternative 2: The no lease areas in this alternative removes site areas of Wild Bill Lake, the Camp Senia Historic District, and two traditional cultural properties from leasing. The Line Creek Ranger Station and one traditional cultural property are located in the C Line Creek management core area and are protected by the "not available" designation. The remaining sites, for which setting is integral to its register quality, are assigned a NSO stipulation to the site itself and a ¼ mile buffer around the site perimeter. This will help protect the site and its setting from destruction or damage and from visual, auditory and olfactory intrusions during well and road construction and use. For the historic sites this buffer protects the setting as seen from the site, but the buffer is an arbitrary one for traditional cultural properties, and may change after further consultation.

This alternative would increase the site data base for the Beartooths and possibly improve access to traditional use areas. Improved access to more remote areas of the District, however may increase site collection and disturbance.

Table 4.8 describes the potential acres of site density by stipulation for each alternative. Development in these areas, based on the predictive model, may require substantial mitigation measures.

TABLE 4.8

Issue 5, Cultural Site Density by Stipulation and Alternative

		ACRES BY ALTERNATIVE				
STIPULATION	SITE DENSITY	2	3	4	4A	5
Not Available	High				1,670	
	Moderate				2,480	
	Low				2,420	
Not Leased	High	1,670				
	Moderste	1,650				
	Low	1,450				
No Surface Occupancy	High	520	1,980	1,880	240	40
	Moderate	1,780	2,260	1,020	130	610
	Low	9,970	5,760	3,160	2,310	940
Timing Limitation	High	10	90	110	150	100
	Moderate	10	1,120	360	720	290
	Low		3,380	650	6,010	110
Controlled Surface Use	High					50
	Moderate			760		20
	Low		350	490		
Timing Limitation/Controlled Surface Use	High					
	Moderate				20	
	Low				20	
Standard Terms	High	120	250	330	360	2,130
	Moderate	440	500	1,740	530	2,960
	Low	1,850	4,130	9,320	2,840	12,450

Alternative 3 and Alternative 4

The NSO stipulations within the site boundaries and site buffer are the same as described for Alternative 2. Wild Bill lake, the Camp Senia Historic District, Rock Creek Ranger Station, Myers Creek Station, Mouat Mine and eight traditional cultural properties are protected by these stipulations and should not be adversely affected. Line Creek Ranger Station and one traditional site are protected through the "not available" designation within the C line Creek core area. Other effects are the same as in Alternative two. Table 4.8 describes the potential site density by stipulation for Alternatives 3 and 4. Development in these areas, based on the predictive model, may require substantial mitigation measures.

Alternative 4A

The "not available" designation removes the Camp Senia Historic District and the Wild Bill Lake site, and two traditional cultural properties from the leasing decision. The NSO stipulation for the site and site buffer of 1/4 mile from the site boundary preserves and protects site integrity and setting for the Line Creek Ranger Station, Myers Creek Ranger Station, Rock Creek Ranger Station, Mouat Mine and Mountain View Townsite, and 7 traditional cultural properties from the adverse effects of development. The alternative should increase the site data base through survey and site recordation and add to the understanding of prehistoric, historic and traditional use of the Beartooths. Development may improve access to traditional use areas for tribal elders, but could increase the opportunity for illicit site collection and disturbance.

Table 4.8 describes the potential site density by stipulation for Alternative 4A. Development in these areas, based on the predictive model, may require substantial mitigation measures.

Alternative 5

This alternative may have an adverse effect on site setting for all the known historic sites and traditional cultural properties. It protects the site within the site boundaries with a NSO stipulation, and the site setting with a CSU stipulation within a ¼ buffer around the site boundary. Reliance on these stipulations and the regulations of the NHPA does not necessarily prevent the loss of the setting of these sites, since issuance of the lease allows development. It may be difficult to resolve these issues at the APD level since the development options may be constrained. Expensive mitigation and lengthy consultation should be anticipated, along with potential conflict with tribal groups interested in protecting traditional cultural properties.

New road access to remote areas of the District may increase the opportunity for site collection and disturbance. This may provide improved access for tribal elders to traditional use areas but will also allow the general public better access to the same areas, possibly adversely affecting this activity. Increase in survey, site recordation, and mitigation in response to development will augment the existing site database and improve the understanding of the Beartooth prehistoric, historic and traditional use.

Table 4.8 describes potential site density based on the predictive model as they are stipulated by Alternative 5. Development in these areas may require extensive mitigation.

Irreversible and Irretrievable Commitments of Resources

Cultural Resources: The benefit of increased site information could be offset by the accelerated rate of site excavation, loss of, and potential residual impacts to the inplace resource. Significant sites that cannot be avoided by project redesign will require site excavation to mitigate the adverse effects through data recovery. This can be extremely expensive and time consuming, the cost of which is borne by the lessee/operator. Systematic controlled excavation that is part of a mitigation plan does provide important data regarding current research questions, but it also reduces the number of preserved sites, thus limiting the number and quality of cultural properties available for the future when techniques, methods and theoretical approaches will have evolved.

Cumulative Effects

Cultural resources: Past development of oil and gas within the decision area has resulted in the construction of six wells, all of which were non-producers, between 1950 and 1990. No cultural resources were found at these locations. Based on the predictive model and the on the ground survey, no cumulative impacts are anticipated for the four RFD locations. However, access roads and peripheral developments may allow access to areas where significant sites are located. Exposure of these properties to the public may encourage artifact collection or similar activities that could alter the sites or desecrate traditional cultural properties. This activity over time may cause the damage or loss of this resource.

4.1.8 ISSUE #6 ROADLESS

Direct and Indirect Effects

The more development and disturbance permitted by an alternative, the greater the potential impact on roadless and, indirectly, on Wilderness values. Leases with an NSO stipulation would remain essentially unchanged from pre-lease conditions and there would be no adverse direct and indirect effects. Leases with a timing limitation stipulation could have ground disturbances which, if located in roadless, could result in losing some natural and pure roadless. The mitigation measures are aimed at avoiding user conflicts and would not mitigate the loss of roadless areas. Leases with a CSU stipulation could have ground disturbances such as drill pad or access road construction, and if in roadless, could result in the loss of some roadless character. CSU mitigation is aimed at decreasing the visual and audible effects and would reduce adverse impacts to the roadless and Wilderness character. The most ground disturbances can be anticipated on leases with standard lease terms.

Table 4.9
Issue 6, Acres by Stipulation by Alternatives

Acres by Stipulation	1	2	3	4	4A	5
Roadless						
No Leasing (NL)	83,910	83,910			3,000	
Not Available (NA)			100	100	38,070	
No Surface Occupancy (NSO)			79,080	71,220	31,370	2,630
Timing Limitations (TL)			2,190	2,020	4,040	4,830
Controlled Surface Use (CSU)			10	1,250	20	28,600
Timing/Controlled Surface Use (TL/CSU)					3,610	
Standard Terms (ST)			2,530	9,320	3,800	47,850

4.1.9 ISSUE #7 QUALITY OF LIFE

Transportation

Transportation traffic volumes will increase for one, perhaps two weeks at the beginning of road construction/reconstruction when earth moving equipment is mobilized and again when the drilling equipment is mobilized to the drill pad. Traffic volumes will increase again when the equipment is demobilized from the area when drilling is completed and reclamation begins (Appendix B and C). The increases in traffic volume will be more noticeable to existing users on the secondary and local roads compared to the drivers using Highway 212 and perhaps Highway 78.

The environmental effects to public safety due to increased traffic and the adequacy of such newly designed or redesigned structures will be analyzed again at the Application for Permit to Drill stage when and if a specific proposal is received. In general, by meeting or exceeding National or State highway engineering standards the potential effects or risks to public safety are acceptable based on societies acceptance of the engineering standards.

Population and Population Demographics

Alternatives 1 and 2: Potential oil industry workers would not have work opportunities because none of the four hypothetical wells (Appendix A & B) could be developed under these alternatives. The workers would not have cause to potentially relocate themselves or their families. As a result, the population and population demographics of Carbon and Stillwater County, Montana and Park County, Wyoming would not be changed from the existing conditions.

Alternatives 3, 4, 4A, and 5: Short term (three to four months) effects to the populations of Carbon and Stillwater Counties may occur as incoming drill rig workers and company representatives stay in temporary quarters such as local hotels or apartments. They would not be expected to permanently relocate their families for such a short period, although some may bring campers or mobile homes that could accommodate their family. There could be about eight to twelve workers per eight hour shift (about 30 per day) depending on the situation (Appendix A & B). Alternatives 3 and 4A will have half the potential increase in population compared to Alternatives 4 and 5 for the life of this decision.

There is an abundance of drill rig workers in Park County, Wyoming; a percentage of them could commute to Carbon and Stillwater Counties so they could sleep at home or spend time with their families. This was the case with the recent drilling attempt by Phillips Petroleum Company. The Phillips company workers stayed on site or in hotels in Red Lodge, Montana.

Long term (Production, Appendix B) effects to Carbon County may include one maintenance worker and family. The well site maintenance worker could also live in Park County, Wyoming and simply commute to the well site. Work-over rig crews (four to eight workers per shift) could also increase the population for one day per month.

Existing demographics for all three counties will not be measurably effected by the potential short and long term changes in population.

Attitudes, Beliefs, and Values

Effects to attitudes, beliefs, and values were analyzed using public comments received during the scoping process and in response to the Draft EIS (Project File). These comments provided the baseline data on which we estimated effects to the attitudes, beliefs, and values of those who responded.

In discussing effects on attitudes, beliefs, and values, we focused primarily on two respondent groups; those who generally oppose oil and gas development and those who generally support oil and gas development. Every attempt was made to describe the effects using words representative of their comments. The effects described below are effects **as we believe they may be perceived** by each grouping.

Alternative 1: Those who were generally opposed to oil and gas development will feel satisfied with the selection of this alternative because of their belief that oil and gas leasing will negatively effect the natural appearing landscape, reduce recreation based tourism revenue, and ruin the sense of place and quality of life. These individuals generally will feel the environment will be saved from the short-sighted oil and gas industry and will probably continue to distrust Forest Service decision makers regardless of the outcome of this decision. They will generally believe this decision is good, far-sighted, and supportive to the environment. To them, the decision will be one small step forward; moving the Forest Service toward recreation and "soft" commodity development and away from traditional "hard on the land" commodity development.

Those who were generally supportive of oil and gas development will be angry and disappointed with the selection of this alternative because of their belief that encouraging oil and gas leasing could enhance the potential to realize economic benefits such as improved tax base to support community services and facilities or jobs created by oil and gas leasing. These individuals will feel the environment is protected sufficiently given adequate regulations and modern technology and oil and gas would be compatible with other uses such as recreation and tourism. They will generally believe the decision is bad and will continue to distrust Forest Service decision makers. To them, the decision reflects a growing Forest Service short-sighted bias away from multiple use management and traditional commodity development in favor of development of recreation commodities.

Alternative 2, 3, 4, and 4A: Those who were generally opposed to oil and gas development may have mixed feelings toward the selection of these alternatives. In a general sense, those opposed to oil and gas development may feel most in agreement with the selection of Alternative 4A followed by Alternatives 2, 3, and 4 respectively because 4A and 2 preclude development by not permitting leasing to occur. Some may feel satisfied with portions of these alternatives because all preclude oil and gas development on the majority of the lands covered by this decision.

Many may continue to not trust the outcome of these decisions, especially Alternatives 4 and 3, because of the use of stipulations in general, particularly the Forest Service reliance on the No Surface Occupancy (NSO) stipulation to mitigate impacts to surface resources from oil and gas activities. They argue the Forest Service "always or regularly" waives, exempts, or modifies all stipulations, most importantly the NSO stipulation. Therefore there is no "hard assurance" the surface resources will really be protected over the long-term. And given these assumptions, there would be no long-term assurance the quality of life or sense of place will remain the same. This fear, of losing or changing the area's sense of place, is the base feeling which compels many to actively resist and distrust the Forest Service proposal and any alternatives which may allow leasing to occur.

These individuals generally may feel environmental disaster has been averted and will probably continue to distrust Forest Service decision makers regardless of the outcome of this decision. Some may generally believe selection of these alternatives will be a decision that is good, compromised, and basically supportive to the environment. Many may generally believe selection of these alternatives is bad, a sell out of the environment due to the fallacy of NSO and other stipulations.

Those who were generally supportive of oil and gas development may have mixed feelings toward the selection of these alternatives. In a general sense, most people in support of oil and gas development may feel in philosophical agreement with the selection of Alternative 4 followed by Alternatives 3, 2, and 4A respectively because 4 and 3 allow some surface occupancy and therefore some development may be possible. Alternatives 4A and 2 would be viewed as unacceptable as they preclude leasing altogether in areas with the highest potential for development.

Most who support oil and gas leasing may be disappointed and angry with the selection of these alternatives because the net outcome may preclude occupancy of the surface for exploration in areas with the best "development potential". Without potential access to the leased minerals, the entire area will be viewed as "all but useless for oil and gas exploration" and the alternative selection equivalent to selecting Alternative 1 (no leasing) or Alternative A (no lands available). This fear, of losing the ability to search for domestic sources of oil, is the base feeling which concerns the oil industry. "Why don't people understand how important oil is to their way of life, their quality of life?" Without secure access to domestic minerals our industry may not compete as effectively in the market place and that may, in turn, effect the economic health and stability of our company offices, workers, and their families.

In general, these individuals will probably continue to distrust Forest Service decision makers regardless of the outcome of this decision. To them, the decision reflects a growing Forest Service bias away from multiple use management and traditional commodity development in favor of development of recreation commodities. They may generally believe selection of these alternatives is bad, compromised, overly restrictive to adequately protect the environment, and the Forest Service "gave in" to environmentalist politics vs looking at the "real" effects.

Alternative 5: Those who were generally opposed to oil and gas development will feel disappointed and angry with the selection of this alternative because of their belief that oil and gas leasing will negatively effect the natural appearing landscape, reduce recreation based tourism revenue, and ruin the sense of place and quality of life. These individuals will feel the environment will be destroyed by the short sighted oil and gas industry and will continue to distrust Forest Service decision makers. They will generally believe this decision is bad and an attack on the environment. To them, the decision reflects the traditional Forest Service bias for traditional commodity development at the expense of recreation commodity development.

Those who were generally supportive of oil and gas development will be satisfied with the selection of this alternative because of their belief that encouraging oil and gas leasing could enhance the potential to realize economic benefits such as improved tax base to support community services and facilities or jobs created by oil and gas leasing. These individuals will feel the environment is protected sufficiently given adequate regulations and modern technology and oil and gas would be compatible with other uses such as recreation and tourism. They will generally believe the decision is good and well balanced although some may continue to distrust Forest Service decision makers despite the outcome of this decision.

Cumulative Effects

Short Term: Potential workers using the local hotels and restaurants during the drilling season may cumulatively add to the influx of summer or winter tourists visiting Red Lodge. The additive effect would probably not be measurable in terms of noticeable changes in population, demographics, and attitudes, beliefs, and values because of the short duration of drilling operations and the relatively low numbers of predicted wells and workers over the next ten years (Appendix B).

Long Term: There are no measurable reasonably foreseeable cumulative effects to population, demographics, and attitudes, beliefs, and values in the long term resulting from production (Appendix A & B). The increases in projected tourism visitors and those buying vacation homes may be more noticeable to the local city and county residents in the long term.

Possible Conflicts With Plans and Policies of Other Jurisdictions

Social impacts disclosed in this EIS will not conflict with any known City, County, or State plans concerning population, demographics and attitudes, beliefs, and values.

Probable Environmental Effects That Cannot Be Avoided

Attitudes, beliefs, and values about the effects of oil and gas development on the three counties will probably not change based on the outcome of this decision. Strong beliefs and the feelings behind them can not be avoided because the issues of oil and gas leasing tend to be all good or all bad depending on the perspective of the individual. One group of individuals will be generally disappointed and angry and the other generally pleased over the outcome.

Relationship Between Short Term Use and Long Term Productivity

Those who are opposed, and those who are supportive, of oil and gas leasing each believe the selection of alternatives in support of their position provides the "best" use and long term productivity of the land. Both groups accuse the other of having a short sighted perspective.

Irreversible and Irretrievable Commitments of Resources

All effects to the "quality of Life" issue are reversible over time because people move or die and values changes as new generations are born. None are irretrievable because the leasing decision can be changed or modified at a later date. Some who are opposed to oil and gas leasing may feel their "sense of place" or "spiritual well being" may be irretrievably lost because they feel strongly today that the effects of this decision will forever change their feelings about living here. Some who are supportive of oil and gas leasing may feel "they have been forever locked out" of the best place to explore for oil and gas resources. To them, this seems like an irretrievable loss.

Consistency With Forest Plan

There are no Forest-wide or Management Area standards or guidelines for the social sciences. Alternatives displayed in this EIS are consistent with the desired future condition described in the Chapter 2 of the Forest Plan and monitoring items described in Chapter 4 of the Plan. The existing demographic, social, and economic characteristics were disclosed in Chapter 3 of the Custer Forest Plan EIS. Effects to these characteristics were not directly disclosed in Chapter 4, however analysis of these issues can be found in Chapter 2, of the Custer Forest Plan FEIS.

4.1.10 ISSUE #8 ECONOMIC STABILITY AND REVENUE

Effects Common to Alternatives

Alternative 1: None of the decision area will be authorized for lease so no new leases can be issued by the BLM. About 131,100 acres (74 percent) of the classified oil and gas occurrence and development lands would immediately become not available. The 46,000 acres already leased would remain accessible until the leases expire, which is 1998 for the last lease. Since this decision can later be changed, potential oil and gas resources could possibly be available for future generations but not for current use.

Alternative 2: Since there are no producing wells, royalties would not be collected, but payments to the U.S. Treasury could total about $240,000 from bonus bids and $180,000 from rentals. Fifty percent of the U.S. Treasury receipts would be returned to Montana to be distributed to school districts within the state by the Office of Public Instruction (OPI), but because of the relatively small population, Carbon County schools would receive only 1.31 percent of the payments, and Stillwater County schools would receive 1.06 percent.

Alternative 3-5: Acres leased could increase to 177,100. Stipulations are less restrictive with each succeeding alternative. It is foreseeable that two wells would be drilled under Alternatives 3 and 4A, one of which is likely a dry hole and the other a producer. All four identified wells could be drilled under Alternatives 4 and 5, with one estimated to produce and three to be dry holes.

The fiscal impacts of the alternatives on various government jurisdictions are displayed in Table 4.10. The revenue generated by bonus bids is shown separately from rentals and royalties to distinguish between the one-time nature of the bonus bids and the annual collection of rentals and royalties. For purposes of estimating bonus bids and lease rentals, it was assumed that all acres authorized for lease would actually be leased. In addition, bonus bid revenue estimates were based upon the minimum bid of $2.00 per acre, and $1.50 per acre was used for the lease rental calculations.

Table 4.10
Fiscal Impacts by Alternative

	ALTERNATIVE				
FISCAL IMPACTS BY ALTERNATIVE ($)	**Alt 1**	**Alt 2**	**Alt 3-4**	**Alt 4A**	**Alt 5**
U.S. Treasury Receipts					
Bonus bids	0	239,760	352,480	232,760	354,200
Rentals & royalties	0	179,820	305,040	215,250	306,330
Payments to State of Montana					
Bonus bids	0	119,880	176,240	116,380	177,100
Rentals & royalties	0	89,910	152,520	107,625	153,165
Payments to Counties from OPI					
Carbon County					
Bonus bids	0	1,570	2,309	1,525	2,320
Rentals & royalties	0	1,178	1,998	1,410	2,006
Stillwater County					
Bonus bids	0	1,271	1,868	1,234	1,877
Rentals & royalties	0	953	1,617	1,141	1,624

In addition to Federal royalties, new oil and gas production in Montana would also be subject to a net proceeds tax, after 12 months of production; the tax rates are seven percent for crude oil and and 12 percent for natural gas after payment of Federal royalties. Using the production estimates from the RFD and the prices discussed above, approximately $27,000 would be generated annually from this tax under Alternatives 3-5. A portion of the $27,000 would be sent to the State, and the remainder would be allocated to the applicable county based upon mill levies for the previous year.

Property taxes on drilling rigs and other equipment vary by location and value of the property. A drilling rig is considered Class 08 personal property for which the taxable value is nine percent of the market value determined by the depth rating and age. Property taxes for 1992 on the drilling rig and certain other property (e.g., mobile home) for the Phillips Ruby Creek well, which is located in Carbon County, were approximately $11,600 (May, 1992). Other property on which taxes might be paid include portable buildings, service company property, and vehicles, but downhole equipment is tax-exempt (ibid., 1991).

Employment and Income

Alternatives 3,4, 4A, and 5: The effects of these four alternatives on employment and income were assessed using IMPLAN, a computerized input-output model, designed to evaluate the impacts on a region's employment, income, and population from increasing or decreasing output of a commodity in response to a change in demand. The change in demand is represented by the drilling expenditures associated with the surface use forecast for each alternative. Because the impacts of oil and gas exploration and production on recreation use were not quantified, no attempt was made to incorporate changes in recreation use into the IMPLAN model.

Relatively detailed cost estimates were available for Phillips Petroleum Company's Ruby A Federal 1-9 well which was drilled on the Beartooth Ranger District in 1990 and 1991. Therefore, that data was used as the basis for analyzing the economic impacts of Alternatives 3-5. The costs of the Phillips Ruby well may not be representative of other wells that may be drilled in the project area. Factors influencing costs include the depth of the well, the amount of road construction and reconstruction necessary, and whether directional drilling is required.

The depth of a well is one of the most important variables affecting drilling costs. An analysis published in the Oil and Gas Journal (1984) indicated that costs of a bare dry hole drilled to 11,500 feet (e.g., Silver Run Creek site in the RFD) could be over 10 times as great as a well drilled to 3,000 feet (e.g., Dean Dome site). Road construction and directional drilling costs were not incorporated into the Oil and Gas Journal analysis. The total cost in 1990 dollars of drilling the Phillips Ruby well to 12,500 feet was estimated to be $4.4 million, including road construction and reconstruction and an allowance for directional drilling (Phillips, 1990). To the extent that the costs of drilling wells under any of the alternatives vary from those for the Phillips Ruby well, the economic impacts will be different from the estimates presented below. Adjustments were made to the IMPLAN model to reflect the likelihood that not all goods and services required to drill an oil and gas well in the project area would be obtained from within Carbon, Stillwater, or Park Counties.

The effects on employment and income in Carbon, Stillwater, and Park Counties can be categorized into direct, indirect, and induced impacts. Direct impacts are the effects on the initial sectors experiencing a change in final demand from the drilling activity, such as construction, oil and gas field services, and wholesale trade (purchases of drill bits). Indirect economic impacts refer to the impacts on industries which provide inputs to the initial sectors mentioned above, and induced impacts are those which result from employees and business owners spending their income within the area. Depending upon the type of impact and the industries affected, employment generated by the drilling activity can be a mixture of seasonal, year-round, full-time, and part-time positions.

The employment and income impacts are shown as a range in Table 4.11 to recognize that wells might not be drilled at the same time. The low end of the range represents the economic effects of drilling one dry hole, while the high end shows the impacts of drilling all wells for a particular alternative at the same time.

Table 4.11
Employment and Income Impacts by Alternative

Alternative	Number of Jobs	Wages and Salaries (millions of 1990 $)
1, 2	0	0
3, 4A	31-70	$.64 - $1.44
4, 5	31-131	$.64 - $2.71

Direct jobs account for slightly over one-half of the total, and the remaining positions are the indirect and induced jobs scattered over a number of industries (e.g., retail trade and eating and drinking places). The short duration of drilling activity may prevent the indirect and induced impacts from completely working through the local economy, so the result may be a temporary increase in hours worked by current employees, rather than the hiring of additional personnel. Many of the workers in the direct category would likely come from Park County, Wyoming, which has a well-established oil and gas sector.

Although no attempt has been made to quantify the impacts of oil and gas exploration, development, and production on recreation use, this does not mean that recreation use will not be affected. Some of the potential consequences of oil and gas activities include the displacement of recreation users to other sites, possibly to locations outside the three counties; a shift in the type of recreation use; a reduction in the level of recreation use, or even an increase in recreation use for some areas due to increased access. Any such changes in recreation use could, in turn, influence recreation expenditure levels or patterns, thereby affecting employment and income in the local economy.

Oil and Gas and Recreation Values

Alternatives 3, 4, 4A and 5: The effects of oil and gas activities on recreation use have not been estimated quantitatively. However, it is possible to estimate the annual value of the projected oil and gas production and then determine the reduction in recreation use that would offset the value of the oil and gas. This type of approach certainly does not constitute a comprehensive benefit/cost analysis, but it does provide some information for evaluating the potential tradeoffs between oil and gas and recreation values.

Using market-clearing prices, the annual value oil and gas output is estimated to be $404,568 (constant 1989 dollars). Based upon the distribution of recreation use in 1991 on the Beartooth Ranger District, the weighted average value per RVD, again using market-clearing prices, is calculated to be $22.03. Thus, recreation use on the District would have to decline by 18,368 RVDs (3.7 percent) from the 1991 level to equal the value of the oil and gas production. If market-clearing prices plus consumer surplus were used to value the oil and gas and recreation, the decrease in the District's recreation use necessary to offset the value of the oil and gas output would be 37,348 RVDs (7.5 percent). A description of market-clearing prices and market clearing prices plus consumer surplus can be found in *Resource Pricing and*

Valuation Procedures for the Recommended 1990 RPA Program (USDA-Forest Service, 1990).

Whether oil and gas activities would cause a reduction of 7.5 percent, or even 3.7 percent, in the District's recreation use (or recreation value) is questionable, considering that only 4 wells are expected to be drilled. On the other hand, the speculative nature of the oil and gas production estimates must be recognized (see Appendix B).

Housing

Alternative 3-5: The impacts on housing will differ only in degree between Alternatives 3-5. The effects depend upon the location and duration of drilling activities and the remoteness of drilling sites. Even when there is a town nearby, workers whose continued presence is critical to the operation may stay at the site, but a drilling crew may sleep in local motels when working every day and then go back home when they have several consecutive days off.

Because of the relatively short duration of the drilling activities, the housing impacts will be focused on the rental, rather than sales, market. Motel and sleeping rooms will be more in demand for wells requiring less time to drill, but workers may favor apartments if drilling is expected to last a number of months. Drilling operations for the wells described in the RFD are projected to take no more than 90 days, so the housing impacts will be very short-term, and operations during tourist seasons may cause increased competition for motel rooms. There may also be some additional pressure on the market for apartment units, but due to the short duration of activities, few workers would move their families to the area.

Community Services and Facilities

Alternatives 3-5: The impacts of Alternatives 3-5 on community services and facilities will be of the same type but will differ in degree. The temporary nature of the drilling operations, the number of jobs generated, and the likely housing patterns of workers will limit the impacts on such community services and facilities as law enforcement, emergency and medical services, and water and sewer systems. Since it is not likely that many families will move into the area, the effects on school systems within the three counties should be negligible.

Cumulative Effects

Cumulative effects are defined as " the impact to the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Biological Resources: The decision area currently is relatively undeveloped. Actions which have cumulatively impacted the area to date include livestock grazing, recreational activities, small scale timber harvesting, and mineral exploration and extraction activities.

Aquatic Flora and Fauna: Other activities (grazing, mining) are currently influencing the habitat of Yellowstone cutthroat trout and the other aquatic species. Cumulative effects to the aquatic environments within the analysis area are expected, but the site specific nature of these effects cannot be adequately evaluated at this time. As the site-specific exploratory or development evaluations are completed, more in depth information on cumulative effects can be developed.

Water Quality: Besides oil and gas activities described in Appendix B and C, additional soil disturbance and sedimentation of streams may occur from small volume timber sales and livestock grazing in the area. Forest Plan Best Management Practices, which include Montana State practices, will be applied to all activities to try and meet or exceed State water quality standards.

Recreation: Loss of roadless lands under alternative 5 might result in increased visitor use of the remaining roadless areas and thereby reduce the feeling of solitude. Effects on traditional recreation opportunities may be substantial with Alternative 3 or 5 but cumulative impacts would be minimal even with these alternatives, unless all four reasonably foreseeable wells were drilled at the same time.

Cultural Resources: Past development of oil and gas within the decision area has resulted in the construction of six wells, all of which were non-producers, between 1950 and 1990. No cultural resources were found at these locations. Based on the predictive model and on-the-ground survey, no cumulative impacts are anticipated for the four RFD locations. However, access roads and peripheral developments may allow access to areas where significant sites are located. Exposure of these properties to the public may encourage artifact collection or similar activities that could alter the sites or desecrate traditional cultural properties. This activity over time may cause the damage or loss of this resource.

Economics: Reasonably foreseeable future actions that may combine with Alternatives 3, 4, or 5 to produce cumulative effects include the expansion of Stillwater Mining Company's operation in Stillwater County, the development of the Crown Butte mine in Park County, Montana, and general economic and demographic trends in all three counties in the analysis area. The economic effects of Alternatives 3-5 themselves are minimal, but they become more significant when combined with the other reasonably foreseeable actions.

Housing: Housing is one area where the cumulative effects will be most apparent. Suitable rental units are already scarce, and population increases related to the alternatives, along with the general trends in population growth, will result in even greater imbalance in the rental market. The combination of actions may also make it difficult for some local jurisdictions to provide adequate services and facilities.

Some management areas contain more potential for cumulative impacts than others. Section 4.2 details potential cumulative effects on a site specific and management area basis.

Possible Conflicts With Plans and Policies of Other Jurisdictions

Presently, BLM has identified a "No Lease" decision on the designated 960 acre Meeteetse Spires Area of Critical Environmental Concern (ACEC) as their preferred alternative in their Draft Oil and Gas RMP/EIS Amendment, because of this site's importance for scenic values as well as protection of the rare plants *Shoshonea pulvinata* and *Townsendia spathulata*. Only alternative 1 may be consistent with this plan.

There are no known conflicts with plans and policies of State, County, or City jurisdictions, but Alternatives 1, 2, and 3 may not be consistent with the "Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area" since the principle to "Encourage opportunities that are economically and environmentally sustainable" for Minerals, Oil and Gas, and Sand, Rock, and Gravel (Pg. 8, 1991) may not be met. By reducing or limiting access to oil and gas resources, Alternatives 1, 2, and 3 also may not be consistent with the intent of Congress as expressed in Public Law 91-631. (Minerals Policy Act) Only Alternatives 4 and 5 may be consistent with the Framework document and National Minerals Policy.

Probable Environmental Effects That Cannot Be Avoided

Soils: For all action alternatives, well pad and road construction would result in disturbance of the soil. Such disturbance varies by alternative depending on the amount of development permitted.

Vegetation: For Alternatives 3, 4, and 5, the amount of surface acres removed from vegetative production will increase slightly (to a maximum of 50 acres over a 15-year period). If production occurs, these areas will remain unvegetated for the life of the well.

Wildlife: Areas with a No Lease, No Surface Occupancy, or Timing Limitation should not produce adverse environmental effects. Areas leased with a CSU stipulation or Standard Lease Terms could have some unavoidable impacts on wildlife habitat and species populations, but there would be none on Threatened and Endangered Species due to protection of the Threatened and Endangered Species Act.

Air Clarity and Quality: Short duration effects to foreground air clarity from road dust and minor short duration effects to air quality from equipment machinery emissions cannot be avoided with any action alternative.

Oil and Gas Resources: Implementation of Alternatives 2, 3, 4, or 5 will change surface occupancy and development activities, operating procedures, and accessibility to potential oil and gas resources. Alternative 1 would maintain the current moratorium on oil and gas leasing.

Relationship Between Short-Term Use and Long Term Productivity

Soils: For all action alternatives, the possibility of erosion increases with disturbance of vegetation, and will continue until rehabilitation is completed. If a well does not produce, the site will be reshaped and reseeded quickly, but it may take several months to several years to re-establish vegetation to original conditions, particularly in alpine areas where the long term effects of various reclamation methods is not well known.

Vegetation: If an action alternative is selected there could be some disturbance to high hazard and fragile soils. The long-term effects of various alpine reclamation methods are not yet known. Not much is known about the physiological and ecological characteristics of most native alpine species. (Biological Evaluation, Project File).

Wildlife: Alternatives which commit surface resources to oil and gas exploration, development, and production may have short-term impacts on 'fish, wildlife, and the public's use of the area. Required reclamation would eventually return the land to approximately the predevelopment condition, so long-term impacts are not anticipated.

Air Clarity and Quality: Even with Alternative 5, short-term effects of road dust and equipment emissions are low, and long-term productivity is not affected.

Water Quality: Impacts to surface water quality are generally short term. If ground water were contaminated, the problem is generally more long term, with effects more difficult and costly to ameliorate.

Oil and Gas Resources: Alternative 1 leaves potential oil and gas resources accessable for future generations and Alternatives 2 through 5 make some potential oil and gas resources available for current use. Alternative 5 provides for the greatest amount of short-term use. Making oil and gas resources available for long-term productivity may require decades of prospecting and exploration.

Alternatives 1 and 2 eliminate all identified foreseeable site locations, thereby prohibiting the reasonably foreseeable exploration in those locations. Alternative 3 eliminates two of the locations, while Alternatives 4 and 5 maintain the reasonably foreseeable exploration of all four locations.

Economics: Payments to the U.S. Treasury in the form of lease rentals, bonus bids, and royalties would increase over current levels under all of the action alternatives, but the development of Federal oil and gas resources during the 10-15 year period covered by the RFD would reduce the amount of resources which could be produced in future years. Potentially greater bonus bids and royalty payments to the U.S. Treasury due to increasing oil and gas prices beyond the next 10-15 years would be foregone, but leasing and development under the action alternatives could prevent drainage of Federal oil and gas resources and loss of revenue to the Federal government through production on adjacent nonfederal lands. The employment impacts of the action alternatives would not cause significant, long-term changes to the structure of the local economy.

Irreversible and Irretrievable Commitments of Resources

The leasing decision where standard terms, timing, and controlled surface use stipulations are used is an irreversible or irretrievable commitment of resources (Conner v. Burford; and Sierra Club v. Petterson). On the other hand, the decision to lease with NSO is not an irreversible or irretrievable commitment of resources (Conner v. Burford, 1988).

Soils: Under action alternatives, all sites will be reclaimed under Federal and State laws. Final reclamation occurs when a well is abandoned, but interim reclamation is done to stabilize producing well sites and roads. There is no irreversible or irretrievable commitment of soil resources.

Vegetation: All effects on vegetation from oil and gas activities are reversible if given adequate time and inputs such as surface soil replacement, seeding, and proper climatic conditions.

Where any action alternative is selected there could be some disturbance to high hazard and fragile soils. Some alpine vegetative communities recover from disturbance without too much difficulty, but the majority do not. Some alpine soils are relatively resistant to disturbance; other erode rapidly. Once the soil is gone in a cold climate, the time required to replace is unknown (Biological Evaluation, Project File).

Recreation: Once the disturbance factor is removed or eliminated, predisturbance conditions and resource utilization patterns would reestablish themselves.

Cultural Resources: The benefit of increased site information could be offset by the accelerated rate of site excavation, loss of, and potential residual impacts to the inplace resource. Significant sites that cannot be avoided by project redesign will require site excavation to mitigate the adverse effects through data recovery. This can be extremely expensive and time consuming, the cost of which is borne by the lessee/operator. Systematic controlled excavation that is part of a mitigation plan does provide important data regarding current research questions, but it also reduces the number of preserved sites, thus limiting the number and quality of cultural properties available for the future when techniques, methods, and theoretical approaches will have evolved.

Water Quality: Contamination of shallow aquifers with brine could be an irreversible and irretrievable loss of resource unless clean-up ameliorates the condition. .

Air Quality: There are no irreversible or irretrievable commitments of air resources anticipated.

Oil and Gas Resources: Although the Federal Government could take back or re-acquire the mineral rights, such taking or re-acquiring could be expensive and difficult. As indicated in the RFD, an economic discovery of hydrocarbons is not expected, but implementation of Alternative 3, 4, or 5 could result in development of Federal oil and gas mineral resources that are not renewable.

Consistency With Forest Plan

Fragile/High Hazard Soils: Applying standard terms to fragile/high hazard soils found in management areas B, D, E, G, and T under Alternative 5 is not consistent with the Forest Plan. Current Forest Plan direction is to apply NSO stipulation to these areas.

Riparian: Applying standard terms to riparian areas under Alternative 5 is not consistent with the Forest Plan. Current Forest Plan direction is to apply NSO stipulation to riparian areas.

Alternative 4 is fully consistent with the Custer National Forest Management Plan. Other alternatives are not consistent and would require amendment of the Plan.

Oil and Gas Resources: Implementation of Alternatives 2, 3, and 5 would require an amendment to Forest-wide direction and management area standards because these alternatives have different standards and stipulations than the current Forest Plan. Alternatives 1 and 4 are consistent with Forest Plan standards, but only Alternative 5 may actually "encourage the exploration and development of mineral and energy resources" consistent with national Forest Service policy.

4.2.0 EFFECTS BY MANAGEMENT AREA

The effects of leasing are disclosed by management area because the leasing decision will be made by management area. The following section discloses environmental effects for each of the management areas.

Most direct and indirect effects to resources are included in Section 4.1. The following displays differences in effects that could change by alternative. Where there are no identified effects for an issue within a specific area, it is not mentioned.

Environmental effects of specific proposed well locations are disclosed by management area. Stipulations by alternative determined which of the proposed well sites could be developed and impacts are disclosed by alternative. For analysis purposes, the West Fork of Red Lodge Creek was selected as the production site (Appendix B).

All map references in Section 4.2 are found in Appendix G at the end of the document. There are seven maps numbered 1 through 7 that have the same base of alternatives and stipulations shown but vary by combinations of resources. Major resources analyzed were combined to reduce the number of maps, yet present the interaction of the stipulations by alternative for the resources.

Effects Common to All Management Areas

A decision to make an area not available or to not lease any portion of an area applies to the mineral resource. However, surface ground disturbance associated with pad construction and road building or other linear projects such as powerlines and pipelines could still take place. This would happen in the event that a special use permit is approved in order to access a geologic target contained on an adjacent lease. This is possible if the adjacent lease is NSO. Such an event would be subject to specific NEPA analysis and the guidance given in the Forest Plan for the Management Area involved.

Alternative 1 is the no leasing alternative and, as there would be no oil and gas related development there will be no additional environmental impacts. Alternative 1 is not discussed in this section.

4.2.1 B MANAGEMENT AREAS:

Table 4.12 displays resource acreage information by alternative and stipulation for all B Management Areas. Individual Management Area information is found in Chapter 3.2.1, Table 3.21.

TABLE 4.12

Resource Acres by Alternative and Stipulation (B Mgmt. Areas)
(Total Acres 20,480)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-10,870	NSO-10,870	NSO-10,870	NSO-10,870	NSO-10,870	ST-10,870
Sensitive Plant Habitat	NL-380	NSO-380	NSO-350 TL-30	NSO-340 LN-40	NSO-340 TL-40	LN-380
Riparian	NL-1,250	NSO-1,250	NSO-1,250	NSO-1,250	NS0-1,250	ST-1,250
Yellowstone Cutthroat Trout						
Verified	NL-210	NSO-210	NSO-210	NSO-210	NSO-210	ST-210
Presumed	NL-120	NSO-120	NSO-40 TL-70 ST-10	NSO-30 TL-10 ST-80	NSO-40 TL-50 ST-30	LN-120
Golden Eagle	NL-1,450	NSO-1,450	NSO-490	NSO-130 TL-360	NSO-490	NSO-130

	1	2	3	4	4A	5
Elk Home Range						
Luther Summer/Fall	NL-20	NSO-20	NSO-10 TL-10	NSO-10 ST-10	NSO-10 TL-10	ST-20
Trout Cr. Winter/Spring	NL-140	NSO-140	NSO-140	NSO-140	NSO-140	ST-140
Trout Cr. Summer/Fall	NL-140	NSO-130 TL-10	NSO-130 TL-10	NSO-130 TL-10	NSO-130 TL-10	ST-140
Meyers Creek Winter/Spring	NL-70	NSO-20 TL-50	NSO-20 TL-50	NS0-20 TL-50	NSO-20 TL-50	ST-70
Black Butte Summer/Fall	NL-20	NSO-20	NSO-20	NSO-20	NSO-20	ST-20
Black Butte Winter/Spring	NL-180	NSO-180	NSO-60 TL-120	NSO-60 TL-120	NSO-60 TL-120	ST-180
Moose Home Range						
McDonald Summer/Fall	NL-740	NSO-740	NSO-420 TL-320	NS0-400 TL-20 ST-320	NSO-420 ST-320	ST-740
McDonald Winter/Spring	NL-1,060	NSO-1,060	NSO-590 TL-470	NSO-270 TL-320 ST-470	NSO-590 TL-470	NSO-130 ST-930
E. Rosebud Winter/Spring	NL-310	NSO-310	NSO-210 TL-100	NSO-210 ST-100	NSO-210 TL-100	ST-310
Red Lodge Creek Winter/Spring	NL-410	NSO-410	NSO-20 TL-390	NSO-20 ST-390	NSO-20 TL-390	ST-410
Mountain Goat Home Range						
E. Rosebud Winter/Spring	NL-30	NSO-30	NSO-30	NSO-30	NSO-30	ST-30
Mule Deer Home Range						
Sheep Creek Winter/Spring	NL-1,870	NSO-1,830 TL-40	NSO-1,830 TL-40	NSO-1,830 TL-10 ST-30	NSO-1,830 TL-10 ST-30	ST-1,870
Visuals	NL-9,600	NSO-9,600	NSO-9,600	NSO-9,600	NSO-9,600	ST-9,600
Visual Corridor	NL-300	NSO-300	NSO-270 TL-30	NSO-250 CSU-50	NSO-250 TL-20 TL/CSU-20	ST-300
Trails	NL-4,330	NSO-2,840 CSU-1,490	NSO-2,840 CSU-1,490	NSO-2,840 ST-1,490	NSO-2,840 ST-1,490	ST-4,330
Roadless	NL-4,850	NSO-4,850	NSO-3,890 ST-960	NSO-3,860 CSU-20 ST-970	NSO-3,860 CSU-20 ST-970	ST-4,850
Cultural (Sites) (Buffer .25 MI)	NL-10	NSO-10 NSO	NSO-10 NSO	NSO-10 NSO	NSO-10 NSO	NSO-10 CSU

4.2.1.1 MA B: BAD CANYON

Ecosystem Integrity

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: High hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects. Approximately 8,700 acres of the 17,260 (50 percent) of the area is high hazard and fragile.

Alternative 5: Standard terms would be applied to the entire area. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2-4A: A lease notice would be applied to 290 acres (2 percent of the area) of sensitive plant habitats (Appendix E). Under alternatives 2-4A, these mapped habitats would receive NSO stipulations.

Alternative 5: A lease notice would be applied to the 290 acres of mapped habitats (Appendix E). These habitats would be under ST stipulations.

Riparian Areas

Alternatives 2-4A: Riparian areas would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Standard terms would apply to the entire area. The 200-meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated by standard terms, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause gullying. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Map 3, 4, 5, and 7)

Fisheries

Alternatives 2-4A: A 300 foot NSO stipulation would apply to 130 acres and TL to 10 acres, for either riparian and/or verified Yellowstone cutthroat trout mitigation of effects. It is expected that all aquatic flora and fauna will benefit from either the riparian and/or Yellowstone cutthroat trout mitigation. These stipulations are intended to provide mitigation to avoid most of the possible effects.

Alternative 5: An ST stipulation would apply to 140 acres, for either riparian and/or verified Yellowstone cutthroat trout mitigation of effects. It is expected that all aquatic flora and fauna will benefit from either the riparian and/or Yellowstone cutthroat trout mitigation. This stipulation, in combination with Forest Plan standards and guidelines, is intended to provide mitigation to avoid most of the possible effects.

Elk

Alternative 2-4A: Selection of these alternatives would lease 100 percent of the 140 acre Trout Creek winter/spring home range with a NSO stipulation. Under the terms of a NSO lease, for this alternative, ground disturbances associated with exploration, development, and production by the lessee would be precluded. No adverse direct or indirect effects to the Trout Creek Elk winter/spring range would be anticipated due to selection of this alternative.

The 140 acre Trout Creek Elk summer/fall home range which exists within this management area would receive two types of stipulations. Approximately 93 percent of this seasonal home range would be leased with a NSO stipulation. Under the terms of a NSO lease, for this alternative, ground disturbances associated with exploration, development, and production by the lessee would be precluded. The remaining 7 percent would be leased with a TL stipulation. Under the terms of the lease, this area would be precluded from occupation from June 1 to November 1 each year. Overall, this alternative would be anticipated to result in no or minimal adverse direct and indirect effects to use of this seasonal home range by the Trout Creek Elk herd.

Finally, the 70 acre Meyers Creek winter/spring home range within this management area would receive two levels of leasing stipulations. Approximately 30 percent of this home range would be leased with a NSO stipulation. Under the terms of a NSO lease, for this alternative, ground disturbances associated with exploration, development, and production by the lessee would be precluded. The remaining 70 percent of the the winter/spring home range would be leased with a TL stipulation, precluding occupation of this area by oil and gas activities from November 30 to July 1 each year.

It is anticipated that this alternative would be sufficient to prevent or minimize direct and indirect effects to elk which use this management area.

Alternative 5: Under this alternative, 100 percent of the seasonal elk home ranges contained within this management would receive standard terms. A more detailed description of the specific herds and seasonal home ranges involved is provided in alternative 2-4A discussion of effects in this management area. Via standard term leasing, two levels of wildlife resource protection may be provided. A drill program may be delayed or deactivated for up a 60 day period. Also, standard term leasing allows for the relocation of a specific well site up to 200 meters.

These elk seasonal home ranges are typically used for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of elk from these seasonal home ranges to suboptimum range would be anticipated.

Mule Deer

Alternatives 2 and 3: The Sheep Creek Mule Deer winter/spring home range would receive two types of stipulations. Approximately 95 percent of this seasonal home range would be leased with a NSO stipulation. Under the terms of a NSO stipulation for these alternatives, ground disturbances associated with oil and gas activities, such as drill pad construction would be precluded. The remaining 5 percent would be leased with a TL stipulation. Ground disturbing activities would be precluded from December 1 to April 15 each year. It is anticipated that this level of resource protection is sufficient to minimize direct and indirect effects to mule deer during the period of home range occupation.

Alternative 4A: The 1870 acre Sheep Creek Mule Deer winter/spring home range would receive three types of stipulations. Approximately 98 percent of this seasonal home range would be leased with a NSO stipulation. Under the terms of a NSO stipulation for this alternative, ground disturbances associated with exploration, development, and production by the lessee would be precluded. Less then 1 percent of the Sheep Creek Mule Deer winter/spring range would be leased with a TL stipulation. Finally, approximately 2 percent of this seasonal home range would be leased with standard terms. The Sheep Creek Mule Deer herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Relocation of the well site by 200 meters may remove the disturbance activity from within elk seasonal home ranges. These stipulations would be anticipated to provide sufficient resource consideration to minimize or reduce direct and indirect adverse impacts to mule deer which use this seasonal home range.

Alternative 5: Under this alternative, 100 percent of the Sheep Creek Mule Deer winter range would receive standard terms.

In this instance, standard terms would be anticipated to have adverse direct and indirect effects to the mule deer which inhabit the area. Typically, mule deer utilize this area for periods of time exceeding 60 days. Also, relocation of the well site by 200 meters would most likely not remove the disturbance activities from the winter/spring home range.

Alternative 5 affords the least amount of protection for the Sheep Creek Mule Deer winter/spring home range of any of the action alternatives.

Issue #3: Aesthetics (Map 2)

Alternative 2: An NSO stipulation would be applied to all slopes over 40 percent. This, along with NSO stipulations for other resources, would cover approximately 75 percent of this management area. The remaining 25 percent that could be occupied would change from a natural appearing landscape to one that would appear modified for the duration of development activities. After that, the views would again be predominantly natural appearing.

Alternatives 3-4A: An NSO stipulation would be applied to all slopes over 40 percent. This, along with NSO stipulations for other resources, would cover approximately 70 percent of this management area. The remaining 30 percent that could be occupied would change from a natural appearing landscape to one that appears modified for the duration of development activities. After that, the views would again be predominantly natural appearing.

Alternative 5: Standard lease terms would apply to the entire area. Where oil and gas occupancy occurs, the landscape would change from natural appearing to modified for the duration of these activities. After that, the views would again become natural appearing. The time lag involved would depend on the extent of the oil and gas activities.

Issue #4: Recreation (Map 6)

Alternatives 2-3: An NSO stipulation applied for other resource protection would cover about 65 percent of the existing trail system, including portions of a ¼ mile buffer on each side of the trail. There would be no effects to the trail system or its users in this area. A ¼ mile CSU stipulation on each side of the trail would be applied to the remaining 35 percent of the trail system. This would result in a reduction of noise and visuals associated with oil and gas activities, but recreationists would still be able to see or hear some of these activities on this portion of the trail. The roads built for oil and gas development would provide increased hunting access into the area.

Alternatives 4-4A: Approximately 66 percent of the trails would be under a NSO stipulation and the reminder would be standard terms. Where occupancy occurs, trail users would possibly hear and see oil and gas development activities. Use of the 200-meter offset and the 60 day-delay would lessen possible disturbance to trail users. There would be increased access into the area for hunters.

Alternatives 4-5: Standard terms would be applied to 100 percent of the trails, and where occupancy occurs, trail users would possibly hear and see oil and gas development activities. Use of the 200-meter offset and the 60 day-delay would lessen possible disturbance to trail users. There would be increased access into the area for hunters.

Issue #6: Roadless (Map 2)

Alternative 2: An NSO stipulation would be applied to the entire area, so there would be no oil and gas related disturbance.

Alternatives 3-4A: NSO stipulations would be applied to approximately 76 percent of the 4040 acre roadless area for other resource considerations (fragile soils and steep slopes). There will be no effects to the roadless qualities found within this area. Standard terms would be applied to the remaining 24 percent. If oil and gas occupancy occurs and depending on the level of development, the roadless qualities of the area may be affected. This area would experience added traffic noise, smells and possibly visual intrusions. If development occurs, additional roading would allow more hunter access in the the area.

Alternative 5: Standard terms would be applied to all of the roadless area found within this management area. If oil and gas occupancy occurs and depending on the level of development, the roadless qualities of the area may be affected as described under alternatives 3-4A..

Cumulative Effects

Issue #4: Recreation - Roadless There is potential for increased access (vehicle and foot) from proposed trail system upgrades and roading within recent timber sale areas on the adjacent Gallatin National Forest. Should oil and gas exploration activities occur, roaded access would be cumulatively increased, resulting in increased human activity, along with the sights, sound, and smells associated with increased traffic. The roadless character would be changed.

4.2.1.2 MA B : LITTLE ROCKY

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: High hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects. There are 720 acres (23 percent) of high hazard or fragile soils in this 3,100 acre MA.

Alternative 5: Standard terms would apply to the entire area. Where fragile soils could not be mitigated by standard terms, reclamation would be more difficult, costly, and time consuming with a higher potential for offsite sedimentation and water erosion until reclamation is successful.

Riparian Areas

Alternatives 2-4A: Riparian areas would be protected by a NSO stipulation, so there would be no environmental effects.

Alternative 5: Standard terms would apply to the entire area. The 200-meter location offset of the well site allowed under standard terms could be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated by standard terms, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause an increase in soil movement. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Fisheries

Alternative 2: A lease notice would be applied where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all developed sites. A NSO stipulation would apply to the 120 acres of habitat under this alternative. This stipulation is intended to provide mitigation to avoid possible effects.

Alternative 3: A lease notice would be applied where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all developed sites. This alternative would also have three different stipulations applied because of other resources. NSO stipulation applies to 40 acres. This would effectively avoid any adverse effects. Another 70 acres would have TL stipulations from October 15 through June 15 for moose winter range. The third stipulation is standard term on 20 acres. Applying the ability to move a well site 200 meters under the ST stipulation along with the riparian protection would provide Yellowstone cutthroat trout mitigation.

Alternative 4: A lease notice would be applied where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all developed sites. Three stipulation situations from other resources are present. NSO on 30 acres, TL on 10 acres, and ST on 80 acres.

Alternative 4A: A lease notice would be applied where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all developed sites. Again, three stipulation situations occur: NSO on 40 acres; TL on 50 acres; and ST on 30 acres.

Alternative 5: A lease notice would be applied where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all developed sites.

Golden Eagle

Alternative 2: Lands within a one mile radius surrounding the known golden eagle nest location would receive a NSO stipulation. This would include approximately 1,450 acres of federal land surrounding the nest. The level of resource protection provided the golden eagle nest via this alternative would be anticipated to prevent or minimize direct or indirect effects to this wildlife resource. This alternative affords the greatest amount of protection to the golden eagle nest location of any action alternative.

Alternative 3,4A: Via this alternative, the area within 0.5 miles of the known golden eagle nest would receive a NSO stipulation. This would preclude ground disturbances associated with oil and gas exploration on approximately 490 acres surrounding this golden eagle nest. This level of protection may or may not protect this wildlife resource.

Alternative 4: Under this alternative, the area within 0.25 miles of the known eagle nest location would receive a NSO stipulation. Additionally, via this alternative, the area within 0.5 miles of the nest would receive a TL stipulation. Approximately 130 acres of federal land would be leased with a NSO stipulation, and an additional 360 acres outside to the NSO area would not experience ground disturbances from February 15 to July 20 each year, via the TL stipulation.

Alternative 5: Under this alternative, the area within 0.25 miles of the known golden eagle nest would receive a NSO stipulation. This would afford approximately 130 acres of NSO protection immediately surrounding the nest site. It is anticipated that this level of resource protection would not be sufficient to protect this wildlife resource. This alternative would afford the least amount of resource consideration of any action alternatives.

Elk

Alternatives 2-4A: Selection of this alternative would result in leasing 100 percent of the 20 acres of summer/fall seasonal home range used by the Black Butte Elk herd with a NSO stipulation. Under the terms of a NSO stipulation for this alternative, ground disturbances during the exploration, development, and production by the lessee would be precluded. This level of resource consideration would be sufficient to prevent or minimize direct and indirect adverse impacts to elk which use this seasonal home range within the management area.

Alternative 5: Under this alternative, 100 percent of summer/fall seasonal home range for the Black Butte Elk herd would receive standard terms.

Given the small amount of summer/fall home range within this management unit, a 200 meter off set would likely remove the disturbance activity from the home range utilized by the Black Butte herd. However, if the site specific topographic relief prevented this relocation, the 60 day program delay or deactivation would not be sufficient to prevent direct or indirect effects to this herd. Typically elk occupy seasonal home ranges for a timespan of greater than 60 days.

Moose

Alternative 2: Under this alternative, 100 percent of summer/winter home range utilized by the McDonald Basin Moose herd would receive a NSO stipulation. Under the conditions of a NSO, ground disturbances such as drill pad placement would be precluded during the exploration phase of oil and gas activity. It is anticipated that this level of resource protection is sufficient to minimize direct and indirect effects to moose with utilize this management area.

Alternative 3,4A: Via this alternative, the McDonald Basin Moose winter/summer range within this management unit would receive two types of stipulations. Approximately 55 percent of this home range would receive a NSO stipulation. Under the terms of a NSO lease, pad placement would be precluded during the exploration phase of oil and gas activities. However, construction of roads necessary to access non NSO lease tracts could occur.

The remaining 45 percent of McDonald Basin home range located within this management area would receive a TL stipulation. Areas which serve primarily as winter range habitat, (low elevation areas adjacent to private land) would be precluded from ground disturbances associated with oil and gas exploration, from October 15 to June 15 each year. Additionally, habitats within the moose home range which primarily serve as summer/fall home ranges, (higher elevation lands near the Absaroka-Beartooth Wilderness) would be precluded from ground disturbances from June 16 to October 14 each year. This level of resource protection should be adequate to minimize potential adverse impacts to moose which utilize home ranges in this management unit.

Alternative 4: Via this alternative, the McDonald Basin Moose home range would receive three types of resource considerations. Approximately 35 percent of McDonald Basin year long home range would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances associated with exploration, would be precluded. Approximately 20 percent of this moose home range would receive a TL stipulation. This level of resource protection results from an overlap of a TL stipulation placed on the golden eagle nest (February 15 to July 20) and a TL stipulation place on the Black Butte Elk summer/fall home range (June 1 to November 1). The effect of these overlapping timing stipulations would provide minimal protection to the McDonald Basin Moose herd.

The remaining portion of the McDonald Basin Moose winter/summer home range, approximately 45 percent, would receive standard terms. These provisions would afford little resource protection for moose which utilize this home range. Typically, moose inhabit either summer or winter habitats within the home range for periods of time exceeding 60 days. Additionally, offset of a drill location by 200 meters would not, in most instances remove the disturbance activity from the home range area.

Selection of this alternative would be anticipated to fragment the year long home range used by the McDonald Basin herd. Direct and indirect effects associated with the stipulations and standard terms imposed on this moose home range, as described in section 4.1 would be expected to take place. At a minimum, displacement to sub-optimum habitat would be anticipated.

Alternative 5: Via this alternative, the McDonald Basin Moose year long home range would receive two levels of resource considerations. Less than 8 percent of this moose home range would experience NSO leasing. The remaining 92 percent of McDonald Basin Moose home range within this management area would receive standard terms. These provisions would afford little resource protection for moose which utilize this home range. Typically, moose inhabit either summer or winter habitats within the home range for periods of time exceeding 60 days. Additionally, offset of a drill location by 200 meters would not remove the disturbance activity from the home range area. Both direct and indirect effects to moose occupation and utilization of seasonal home ranges would be anticipated under this alternative.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: An NSO stipulation would be applied to all slopes over 40 percent. There would be no change in the natural appearance of these visually sensitive landscapes.

Alternative 5: Slopes over 40 percent would be leased with standard terms. Where oil and gas occupancy occurs, views from off-site would appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #5: Cultural Resources

Alternatives 2-4A: The one traditional cultural property that is located in this management area would be protected by an NSO stipulation for the site area, and for 1/4 mile from the site boundary. This buffer may change upon consultation with the Crow tribe. There would be no direct impact to the site.

Alternative 5: The one traditional cultural property that is located in this management area would be protected by an NSO stipulation for the site and a CSU stipulation from 1/4 mile from the site boundary. This buffer may change upon consultation with the Crow tribe. There would be an increased possibility for adverse impact to this site under this alternative than for the previous alternatives.

Cumulative Effects

Issue #3: Aesthetics - Oil and gas activities, cumulatively with aspen stand manipulation and post and pole sales, may effect the existing visual condition. The changes to the existing visual condition from these types of projects may be noticeable for 5-10 years.

4.2.1.3 MA B : BLACK BUTTE

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2-4A: High hazard and fragile soils which occur on 1,420 acres would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Standard terms would apply to the entire area. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for off-site sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2: A lease notice would be applied to the 60 acres of sensitive plant habitats (Appendix E). Normal ST allows a proposed site to be moved up to 200 meters. If sensitive plants are discovered through intensive site surveys it is anticipated that most plant habitats will be protected by the ST stipulation.

Alternative 3: In addition to a lease notice, 30 acres would be NSO and another 30 acres would have TL stipulation. The NSO stipulation would prevent any surface disturbance. The remaining area under TL may allow occupancy if any sensitive species are not found. If any are found on the area, the ability to move 200 meters under ST would probably mitigate any effects to such species.

Alternative 4: This alternative has 20 acres NSO and 40 acres ST. The effects would be the same as for alternative 3. The minor acreage difference would not cause increased impacts to any sensitive species discovered. A lease notice would also be included with the lease.

Alternative 4A: This alternative is similar to 4 with 20 acres of NSO and 40 acres of TL stipulation along with a lease notice. Since the timing is for moose winter range it will have not effect in protecting sensitive plant habitat. The effect of the standard terms will be the same as alternative 4.

Alternative 5: A lease notice would be applied to the 60 acres of sensitive plant habitat. Only standard terms would apply. Moving a site 200 meters can protect about 30 acres. The possibility exists for some loss of potential habitat from site occupancy under this alternative.

Riparian Areas

Alternatives 2-4A: Riparian areas of 170 acres would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Standard terms would apply to the entire area. The 200-meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause gullying. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Elk

Alternative 2: Under this alternative, 100 percent of the 180 acres of Black Butte Elk winter/spring home range would receive a NSO stipulation. Under the terms of the NSO lease, pad placement would be permitted during the exploration phase of oil and gas activities. It is anticipated that this level of resource protection would be sufficient to minimize direct or indirect effects to the Black Butte Elk home range.

Alternative 3, 4, 4A: Under these alternatives, the Black Butte Elk winter/spring home range would receive both NSO and TL stipulations. Approximately 60 acres or 33 percent of this seasonal home range would experience NSO leasing. Under the terms of a NSO lease, pad placement would be precluded during the exploration phase of oil and gas activities. The remaining 67 percent of the Black Butte Elk winter/spring home range would be leased with a TL stipulation. Ground disturbances associated with exploration and development of oil and gas resources would be precluded from November 30 to July 1 each year. This level of resource protection is anticipated to minimize adverse direct or indirect effects to the Black Butte home range within this management unit.

Alternative 5: Under this alternative, 100 percent of the Black Butte Elk winter/spring home range would receive standard terms.

Application of standard terms would be anticipated to have adverse direct and indirect effects to the Black Butte Elk herd within this management unit. Typically, the elk which utilize habitat within this management unit do so for periods exceeding 60 days. Additionally, relocation of a well site up to 200 meters would not in most instances remove the disturbance activity from the winter/spring home range. At a minimum, displacement of elk from seasonal home ranges within this management unit would be anticipated.

Moose

Alternative 2: Under this alternative, 100 percent of the 390 acres of seasonal home ranges for the McDonald Basin and East Rosebud Moose herds, contained within this management area would receive a NSO stipulation. Under the terms of the NSO lease, pad placement would not be permitted during the exploration phase of oil and gas activities. It is anticipated that this level of resource protection is sufficient to minimize direct or indirect effects to Moose home ranges within this management unit.

Alternative 3, 4A: Under these alternatives, the two moose home ranges contained within this management area would receive two types of stipulations.

Approximately 75 percent of the 80 acre McDonald Basin Moose herd's winter/spring home range would receive a NSO stipulation. The remaining 25 percent of this seasonal home range utilized by the McDonald Basin Moose home range would receive a TL stipulation. Winter/spring home ranges (low elevations, adjacent to private lands would not experience occupation from October 15 to June 15 each year.

Approximately 70 percent of the 310 acre East Rosebud winter/spring home range within this management area would receive a NSO stipulation. Pad placement would be precluded on this area. The remaining 30 percent of this winter/spring home range would receive a TL stipulation. Under the terms of a TL stipulation, occupation of the ground, associated with oil and gas activities could not occur from October 15 to June 15 each year.

It is anticipated that this level of resource considerations would be sufficient to prevent or minimize direct or indirect effects to moose herds within this management area.

Alternative 4: Under this alternative, 70 percent of seasonal home range utilized by the East Rosebud Moose herd would receive a NSO stipulation. Under the terms of a NSO lease, pad placement during the exploration phase of oil and gas activities would be precluded. Approximately 15 percent of this winter/spring home range would receive a Controlled Surface Use (CSU) stipulation. Implementation of this stipulation would require operators to visually and audibly screen operations to the extent possible. Finally, approximately 15 percent of the East Rosebud winter/spring home range within this management area would receive standard terms. The East Rosebud Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this moose seasonal home range. At a minimum, displacement of moose from these seasonal home ranges to sub-optimum range would be anticipated.

The McDonald Basin Moose herd uses winter/spring home range within this management area. Via this alternative, two levels of resource considerations would be afforded this herd. Approximately 75 percent of this home range would receive a NSO stipulation. Under the terms of a NSO stipulation for this alternative, ground disturbances during the exploration phase of oil and gas activity, such as drill pad construction would be precluded. The remaining 25 percent of the home range would receive a CSU stipulation. CSU stipulations are designed to screen visual or noise impacts during oil and gas activities. This stipulation affords mitigation to wildlife resources. It is anticipated that selection of this alternative would reduce or minimize direct and indirect effects to the

McDonald Basin Moose during use of the winter/spring seasonal home range contained in this management area.

Alternative 5: Under this alternative, 100 percent of the year long home range utilized by the McDonald Basin and East Rosebud Moose herds would receive standard terms.

Leasing with standard terms would be anticipated to have adverse direct and indirect effects to both the McDonald Basin and East Rosebud Moose herds. Both of these moose herds occupy their respective seasonal home ranges for longer than 60 day periods. Additionally, relocation of a well site up to 200 meters may or may not remove the disturbance activity from the seasonal home range. At a minimum, displacement of moose from seasonal home ranges would be anticipated.

Mountain Goats

Alternatives 2-4A: Under this alternative, 100 percent of the East Rosebud Mountain Goat winter/spring home range would receive a NSO stipulation. Under the terms of the NSO lease, no pad placement would be permitted during the exploration phase of oil and gas activities. It is anticipated that this level of resource consideration is sufficient to minimize direct or indirect effects to the East Rosebud Mountain Goat winter/spring home range within this management area.

Alternative 5: Under this alternative, 100 percent of East Rosebud Mountain Goat winter/spring home range would receive standard terms.

Leasing with standard terms would be anticipated to have adverse direct and indirect effects to mountain goats within this management unit. Typically, the mountain goats which utilize habitat within this management unit do so for periods exceeding 60 days. However, relocation of a well site up to 200 meters may remove the disturbance activity from the seasonal home range. Displacement of mountain goats from occuppied home ranges could be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: An NSO stipulation would be applied to all slopes over 40 percent. This would cover approximately 24 percent of the entire management area. An additional 60 percent would be covered by NSO stipulations for other resource considerations. The remaining 16 percent that could be occupied would change from a natural appearing landscape to one that would appear modified for the duration of these activities. Following restoration, the views would again be predominantly natural appearing.

Alternatives 3-4A: An NSO stipulation would be applied to all slopes over 40 percent. This would cover approximately 24 percent of the entire management area. An additional 50 percent of the area would also be covered by NSO stipulations for other resource considerations. The remaining 26 percent that could be occupied would change from a natural appearing landscape to one that would appear modified for the duration of these activities. Following restoration, the views would again be predominantly natural appearing.

Alternative 5: Essentially all of this 2620 acre area could be occupied. Those portions that could be occupied would change from a natural-appearing landscape to one that would appear modified for the duration of these activities. Following restoration, the views would again be predominantly natural appearing.

Visual Corridors

Alternative 2: All 300 acres of the visual corridor would have NSO stipulations for other resource considerations. There would be no visual impacts.

Alternatives 3: About 85 percent of the visual corridor would have NSO stipulations for other resource considerations. The remaining 15 percent portion would be covered by CSU, where the operator would visually and audibly screen operations as much as possible. There would be no visual impacts.

Alternative 4: About 83 percent of the visual corridor would be NSO and 15 percent CSU. This is a small change from alternative 3 and there would be no effects.

Alternative 4A: Three stipulations would apply for this alternative. About 250 acres or 83 percent of the visual corridor would be NSO, 30 acres or 10 percent would be TL and the remaining seven percent would be TL/CSU. Under this situation no visual effects are anticipated.

Alternative 5: All of the visual corridor would be under ST stipulation and could be occupied, subject to a 200 meter offset of a proposed site. The landscape could change from natural appearing to modified for the duration of these activities. Following restoration, the views would again be predominantly natural appearing.

Issue #6: Roadless (Map 2)

Alternatives 2-3: NSO stipulation would be applied to the 810 acres of roadless area, so there would be no environmental impacts.

Alternative 4-4A: Three stipulations would be applicable to the area. About 780 acres, or 96 percent, of the roadless area would be covered by NSO stipulation for other resource considerations. Another 20 aces, or about 2 percent, would be CSU and the remaining 10 acres would be ST. Application fo the mitigations and Forest Plan standards and guidelines should provide environmental protection such that there would be no environmental effects.

Alternative 5: Leasing with 100 percent standard terms would allow development, and the roadless characteristics of the area would be affected if occupancy occurs. This area would have added traffic noise, smells and possible visual intrusions. If developed, additional roads could allow hunter traffic access to increase during hunting seasons. The roadless character would be reduced to a roaded natural appearing area.

4.2.1.4 MA B : BUTCHER CREEK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2-4A: High hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Standard Terms would apply to the entire area. The 200 meter location offset of the well site allowed under standard terms would be utilized to mitigate most effects to high hazard and fragile soils. Reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternatives 2-4A: A lease notice would be applied to sensitive plant habitat (Appendix E). However, since these areas would be covered by NSO stipulations for fragile soils and steep slopes, no environmental effects would occur.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E). The standard terms stipulation may mitigate any sensitive plant habitat if any are found through intensive site surveys. If occupancy occurs there could be some short term loss of potential habitat.

Riparian Areas

Alternative 2-4A: Riparian areas would be protected by an NSO stipulation, so there are no environmental effects.

Alternative 5: Standard terms would apply to all riparian areas. The 200-meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Elk

Alternative 2: Under this alternative, 100 percent of the Luther Elk herd's 20 acres of summer/fall range which lies within this management unit, would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances during the exploration phase of oil and gas activity would be precluded. It is anticipated that this level of resource protection is sufficient to minimize or reduce direct or indirect effects to this wildlife resource. This alternative affords elk which utilize this management unit the highest degree of protection of any of the action alternatives.

Alternative 3, 4A: Under these alternatives, the summer/fall home range by the Luther Elk herd would receive two types of stipulations. Approximately 50 percent of this seasonal home range would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances associated with exploration, such as pad placement would be precluded. The remaining 50 percent of this seasonal home range would receive a TL stipulation. Under the terms of this lease, ground disturbances associated with oil and gas, include exploration, development, and production would not be permitted from June 1 to November 1 each year. It is anticipated that this level of resource protection would be sufficient to reduce or minimize direct and indirect effects to this wildlife resource.

Alternative 4: Under this alternative, the Luther Elk herd's summer/fall home range which occurs within this management area, would receive two types of stipulations. Approximately 50 percent of this seasonal home range would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances such as pad placement, associated with exploration activities would be precluded.

The remaining 50 percent of this seasonal home range would be leased with standard terms.

In this instance, standard terms would be anticipated to have adverse direct and indirect effects to elk which utilize this management unit. Typically, the Luther Elk herd uses the summer/fall home range in this area for periods of time exceeding 60 days. This management unit serves as an important migration corridor between summer/fall ranges which lie at higher elevations adjacent to the A-B Wilderness and the winter/spring home ranges which lie entirely on adjacent private lands. Also, relocation of a well site by 200 meters would not remove the disturbance activity from elk home range.

Alternative 5: Under this alternative, 100 percent of summer/fall home range use by the Luther Elk herd with standard terms.

In this instance, standard terms would be anticipated to have adverse direct and indirect effects to elk which utilize this management unit. Typically, the Luther Elk herd uses the summer/fall home range in this area for periods of time exceeding 60 days. This management unit serves as an important migration corridor between summer/fall ranges which lie at higher elevations adjacent to the A-B Wilderness and the winter/spring home ranges which lie entirely on adjacent private lands. Also, relocation of a well site by 200 meters would not remove the disturbance activity from elk home range.

Moose

Alternative 2: Via this alternative, 100 percent of 410 acres of winter/spring home range used by the Red Lodge Creek Moose herd would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances during the exploration phase of oil and gas activity would be precluded. It is anticipated that this level of resource protection is sufficient to minimize or reduce direct or indirect effects to this wildlife resource.

Alternative 3, 4A: Under this alternative, the winter/spring home range used by the Red Lodge Moose herd would receive two types of stipulations. Approximately 5 percent of this area would be leased with a NSO stipulation. Under the terms of a NSO lease, ground disturbances such as pad placement, associated with exploration would be precluded. The remaining 95 percent of this seasonal home range used by the Red Lodge Moose herd would receive a TL stipulation. Ground disturbances associated with oil and gas exploration, development, and production would be not be permitted from October 15 to June 15 each year. This level of wildlife resource protection is believed to be sufficient to reduce or minimize direct or indirect effects to moose which use this management unit.

Alternative 4: Under this alternative, the winter/spring home range used by the Red Lodge Creek Moose herd would receive a two levels of resource considerations. Approximately 5 percent of this home range would receive a NSO stipulation. The remaining 95 percent would receive standard terms only.

The Red Lodge Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. At a minimum, displacement of moose from these seasonal home ranges to suboptimum range would be anticipated.

Alternative 5: Under this alternative, 100 percent of the winter/spring home range for the Red Lodge Moose herd would receive standard terms.

In this instance, standard terms would be anticipated to have adverse direct and indirect effects to moose which utilize this management unit. Typically, the Red Lodge Creek Moose herd uses the winter/spring home range in this area for periods of time exceeding 60 days. Also, relocation of a well site by 200 meters would not remove the disturbance activity from the moose home range. At a minimum, displacement of moose from these seasonal home ranges to suboptimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: NSO stipulation would be applied to all slopes over 40 percent. This would cover less than five percent of the management area. The remaining 95 percent of the area would be covered by NSO stipulation for other resource considerations, so there would be no environmental effects.

Alternatives 3-4A: NSO stipulation would be applied to all slopes over 40 percent. This would cover less than five percent of the management area. An additional 54 percent would be covered by an NSO stipulation for other resources. The remaining 42 percent of the area would be available for surface occupancy under ST or TL stipulations.

Those portions that are developed under TL or ST stipulations would be essentially the same and would change from a natural-appearing landscape to one that would be modified for the duration of these activities. After that, the views would again be predominantly natural appearing.

Alternative 5: Essentially 100 percent of this management area would be occupied under standard lease terms. Those portions that are developed would change from a natural appearing landscape to one that would be modified for the duration of these activities. After that, the views would again be predominantly natural appearing.

Issue #5: Cultural Resources

Alternatives 2-5: According to the site location model, the well site is within the area of moderate site density. On the ground survey of the location revealed no cultural resources. It is not adjacent of in view of any of the known traditional cultural properties or historic sites. The would be no direct impact to known sites.

4.2.1.5: HYPOTHETICAL WELL SITE

The hypothetical West Red Lodge well site would be located within this management area. The environmental effects of occupying this site are discussed below. This well site is located on moderate oil and gas development potential. Refer to Appendix A and B for more specific details.

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-5: The well site would not be located on any high hazard or fragile soils.

Sensitive Plants

Alternative 2-4A: The well site would not be occupied under NSO, so no environmental impacts would occur. The lease will also have a lease notice that indicates surveys would be needed before any site disturbance could occur. (Appendix E)

Alternatives 5: About 14 acres could be disturbed for pad and road construction/reconstruction under standard terms. None of the affected area is known to be sensitive plant habitat. The lease will also have a lease notice that indicates surveys would be needed before any site disturbance could occur. (Appendix E) If development is allowed some loss of potential habitat my occur.

Riparian Areas

Alternatives 2-4A: The well site would not be located in any riparian areas as all are protected with a NSO stipulation.

Alternative 5: All of the area would be leased with standard terms. Since this is a small area it is most likely that moving a site up to 200 meters would provide adequate protection to riparian areas.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: Selection of this alternative would preclude activation of this well site location. No effects related to oil and gas activities would be anticipated due to selection of this alternative.

Alternative 3 and 4A: The area surrounding this well location serves as a migration corridor connecting the Luther Elk herds summer/fall and winter/spring home ranges. It is anticipated that the NSO and TL stipulations applied to the area would be sufficient to protect use of migration corridors during both the late spring and late fall migration periods.

This well location may experience production as detailed in Appendix B. The level of activity anticipated at this site during the initial phases of production may have adverse direct and indirect impacts to wildlife in the area. Once production is established, impacts over time would be expected to diminish. The occasional servicing of production facilities would have a relatively small impact to wildlife. If a timing restriction were placed on servicing and collection of oil and gas resources from the production facilities, impacts would be further reduced.

Alternative 4 and 5: Via alternative 4 or 5, the area surrounding this well location would experience standard term leasing. This well location would be in the middle of the migration corridor which links the Luther winter/spring home range with the summer/fall home range. It is anticipated that a shift in migration corridors would take place. Impacts to the Luther Elk herd would vary depending on the time it took to establish new migration routes.

Moose

Alternative 2: Selection of this alternative would preclude activation of this well site location. No effects related to oil and gas activities would be anticipated due to selection of this alternative.

Alternative 3 and 4A: Selection of this alternative would activate the well site. The area surrounding this location would receive a TL stipulation due to occupation of the area by the Red Lodge Creek Moose herd. The TL stipulation on 95 percent of the area would preclude occupation of this area from October 15 to June 15. Moose do not typically use this area during the summer/fall months of the year when drilling operations would take place. This level of resource protection would be sufficient to reduce or minimize direct or indirect effects to members of the Red Lodge Creek Moose herd.

Alternative 4 and 5: Via alternative 4, the area surrounding this well location would experience standard term leasing. If this drill location were activated impacts to the Red Lodge Creek Moose herd could occur. It is anticipated that occupation of this winter/spring range would, at a minimum displace the Red Lodge Creek Moose to other habitats during the winter/spring months of the year.

Additionally, this well location may experience production as detailed in Appendix B. The level of activity anticipated at this site during the initial phases of production may have adverse direct and indirect impacts to wildlife in the area. Once production is established, impacts over time would be expected to diminish. The occasional servicing of production facilities would have a relatively small impact to wildlife. If a timing restriction were placed on servicing and collection of oil and gas resources from the production facilities, impacts would be further reduced.

Issue #3: Aesthetics (Map 2)

Alternative 2: NSO stipulation would apply to the well site for protection of the Red Lodge Creek moose herd. The well site would not be occupied, so there would be no effect on the aesthetics.

Alternatives 3-5: Approximately 14 acres would be disturbed. The site itself would appear heavily modified until reclamation activities are completed. The potential effects of emissions of the well site on visibility were evaluated with VISCREEN model (Air Quality Report, Project File). The VISCREEN analysis indicated that the nitrogen dioxide and particulate emissions associated with well sites would have localized and minimal impacts which would be essentially invisible to observers from main road viewing points or from the Absaroka-Beartooth Wilderness boundary.

Issue #5: Cultural Resources

Alternatives 2-5: According to the site location model, the well site is within the area of moderate site density. On-the-ground survey of the location revealed no cultural resources. It is not adjacent or in view of any of the known traditional cultural properties or historic sites. There would be no direct impact to known sites.

Issue #7: Quality of Life

Alternative 2: NSO stipulation would apply to the well site. The well site would not be occupied, so there would be no effect on air and water quality as they relate to quality of life.

Alternatives 3-5: The VISCREEN model (Air Quality Report, Project File) was used to compare the dispersion of well site emissions of the Red Lodge Creek Well Site with National Ambient Air Quality standards. All of the modeled concentrations for nitrogen dioxide and particulates would be well within Montana and National Ambient Air Quality Standards and considerably below Class II increment levels. Emission levels during production would be considerably less than exploration, with no anticipated adverse health effects. Assuming the West Fork Red Lodge Creek site well would be brought into production and no H_2S is encountered, emissions of nitrogen oxides, sulfur dioxide, and carbon monoxide would be negligible. The primary potential air quality impacts would be from road dust particulates from vehicle travel. About 14 acres of land would be disturbed and any impact to water quality from suspended sediments would be extremely small.

Cumulative Effects

Issue #7: Quality of Life - If wells were drilled within two miles of each other, some combination of emissions could occur. However, the projected well sites are sufficiently separated that, even if drilled simultaneously, cumulative air quality impacts would not occur. Emissions associated with production for the potential well site would consist of road dust particulates and negligible levels of nitrogen oxide, sulfur dioxide, and carbon monoxide. Cumulative impacts with other sources would be unlikely. Therefore, no cumulative air quality impacts of the West Fork Red Lodge Creek RFD site, if developed as a producing well, would be expected.

4.2.2 C MANAGEMENT AREAS:

The following table displays resource acreage information by alternative and stipulation for all C Management Areas. Individual Management Area information is found in Chapter 3.2.2 Table 3.22.

Table 4.13
Resource Acres by Alternative and Stipulation (C Mgmt. Areas)
(Total Acres 20,480)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-10,320	NA-120 NL-640 NSO-9,560	NA-120 NSO-10,200	NA-120 NSO-10,200	NA-1,540 NL-5,230 NSO-3,550	NSO-770 TL-4,210 ST-5,340
Sensitive Plant Habitat	NL-2,610	NA-120 NL-630 NSO-1,860	NSO-2,610	NSO-2,610	NA-190 NL-2,120 NSO-300	NSO-340 TL-840 LN-1,430
Riparian	NL-1,750	NA-40 NSO-1,710	NA-40 NSO-1,710	NA-40 NSO-1,710	NA-80 NL-1,110 NSO-560	NSO-1,750
Yellowstone Cutthroat Trout						
Presumed	NL-210	NL-90 NSO-120	NSO-210	NSO-210	NL-210	NSO-170 TL-10 ST-30
Eagle	NL-1,450	NSO-1,450	NSO-480	NSO-480 TL-110	NSO-480	NSO-110
Prairie Falcon	NL-190	NSO-190	NSO-190	NSO-90	NSO-90	NSO-90
Grizzly MS 1	NL-2,740	NL-2,740	NSO-2,740	NSO-2,740	NL-2,740	NSO-660 TL-2,080
Grizzly MS 2	NL-2,890	NSO-2,890	NSO-2,890	NSO-2,890	NL-2,890	NSO-380 ST-2,510
Elk Home Range						
Meyers Creek Winter/ Spring	NL-190	NSO-190	NSO-190	NSO-190	NSO-190	TL-190
Picket Pin Winter/Spring	NL-410	NSO-410	NSO-410	NSO-410	NSO-410	TL-410
Line Creek Winter/Spring	NL-5,340	NA-800 NSO-4,540	NA-800 NSO-4,540	NA-800 NSO-4,540	NSO-3,660 TL-1,680	NSO-200 TL-5,140
Line Creek Summer/Fall	NL-4,540	NSO-4,540	NSO-4,540	NSO-4,540	NA-790 NSO-3,750	NSO-160 TL-4,380
Moose Home Range						
Palisades Winter/Spring	NL-340	NSO-340	NSO-340	NSO-340	NSO-340	NSO-30 TL-310
Bighorn Sheep Home Range						
Stillwater Winter/Spring	NL-640	NL-640	NSO-640	NSO-640	NL-640	NSO-60 TL-580
Rock Creek Winter/Spring	NL-1,030	NSO-1,030	NSO-1,030	NSO-1,030	NA-940 NSO-90	NSO-50 TL-260 ST-720
Mountain Goat Home Range						
Line Creek Summer/Winter	NL-3,620	NSO-3,620	NSO-3,620	NSO-3,620	NA-850 NSO-2,740 ST-30	NSO-140 TL-2,600 ST-880

	1	2	3	4	4A	5
Trails	NL-5,900	NA-80 NSO-5,820	NA-80 NSO-5,820	NA-80 NSO-5,820	NA-70 NL-1,770 NSO-3,710 TL-260 ST-90	NSO-580 TL-3,600 ST-1,720
Cultural (Site) (Buffer .25 MI.)	NL-30	NSO-30 NSO	NSO-30 NSO	NSO-30 NSO	NSO-30 NSO	NSO-30 CSU
Visuals	NL-6,930	NA-480 NSO-6,450	NA-480 NSO-6,450	NA-480 NSO-6,450	NA-1,110 NSO-5,820	NSO-240 TL-5,270 ST-1,420
Roadless	NL-9,090	NA-100 NSO-8,990	NA-100 NSO-8,990	NA-100 NSO-8,990	NA-1,540 NL-3,000 NSO-2,780 TL-1,770	NSO-740 TL-4,830 ST-3,520

4.2.2.1 MA C : MEYERS CREEK

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Elk

Alternatives 2-4A: Under these alternatives, 100 percent of the winter/spring home range used by the Meyers Creek Elk herd, would receive a NSO stipulation. Under the terms of a NSO lease, ground disturbances associated with exploration, such as pad placement would be precluded. This level of resource consideration is thought to be sufficient to reduce or minimize any direct or indirect effect to wildlife resources which use this area.

Alternative 5: Via this alternative, 100 percent of the 190 acres of Meyers Creek Elk winter/spring home range contained in this management unit, would receive a TL stipulation. Under the terms of the lease, ground disturbances associated with oil and gas activities would not be permitted from November 30 to June 15 each year. This level of resource protection would be sufficient to protect the Meyers Creek Elk utilization of the winter/spring home range contained within this management area.

4.2.2.2 MA C : PICKET PIN

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: High hazard and fragile soils would be protected by an NSO stipulation so there would be no environmental effects.

Alternative 5: NSO stipulation for riparian areas would cover about five percent of the fragile soils in this management area. There will be no effects here. Standard terms will be applied to 870 acres, or about 93 percent, of the remaining area, which constitutes about 42 percent of the management area. Another 20 acres would have TL stipulation. However, TL does not provide any protection for soils so this will also come under standard term protection.

Where high hazard and fragile soils cannot be mitigated by standard terms, reclamation would be more difficult, costly, and time consuming with a higher potential for offsite sedimentation and water erosion until reclamation is successful.

Riparian Areas

Alternatives 2-5: NSO stipulation would be applied to all riparian areas so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternatives 2, 3, and 4A: Under these alternatives, the entire management unit, including 100 percent of the winter/spring home range used by the Picket Pin Elk herd, would receive a NSO stipulation. This level of resource consideration should reduce or minimize direct or indirect effect to wildlife resources which use this area.

Alternative 5: Via this alternative, 100 percent of the Picket Pin Elk winter/spring home range, contained in this management unit, would receive a TL stipulation. Under the terms of the lease, ground disturbances associated with oil and gas activities would not be permitted from November 30 to June 15 each year. This level of resource protection would be sufficient to minimize direct and indirect effects to wildlife values in this management unit.

Issue #4: Recreation (Map 6)

Alternative 2-4A: NSO stipulation would be applied to all recreation areas and trails. There would be no effects to the existing trail system.

Alternative 5: Standard terms would be applied to the trails in this area. A small portion (60 acres) would be covered by NSO stipulations for fragile soils and riparian areas. Trails within the Picket Pin elk winter range (260 acres) would be covered by a TL stipulation from November 30 to June 15 annually. However, this stipulation would not benefit recreation users since during this time period the area receives little use due to weather conditions and snowpack. During the summer months, trail users would possibly hear and see oil and gas development activities as they hike the portion of trails not covered by NSO. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to trail users.

Issue #5: Cultural Resources

Alternatives 2-4: The one traditional cultural property that is located in this management area would be protected by an NSO stipulation for the site and for ¼ mile from the site boundary. This buffer may change upon consultation with the Crow tribe. There would be no direct impact to the site.

Alternative 5: The one traditional cultural property that is located in this management area would be protected by an NSO stipulation for the site and a CSU stipulation for ¼ mile from the site boundary. This buffer may change upon consultation with the Crow tribe. There would be an increased possibility for impact to this site over the other alternatives.

Issue #6: Roadless (Map 2)

Alternative 2-4A: An NSO stipulation would be applied to all of the roadless area within this management area. there would be no environmental effects as a result.

Alternative 5: Standard terms would be applied to 1160 acres, 96 percent, of the roadless area. A small portion (about 40 acres) would be covered by an NSO stipulation for riparian areas, and an even smaller portion (about ten acres) would be covered by the TL for the elk range. Over 96 percent of the roadless area may lose its roadless character if oil and gas development occurs.

4.2.2.3 MA C : STILLWATER

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4: High hazard and fragile soils would be protected by an NSO stipulation so there are no environmental effects. Alternative 2 also has a portion that is not leased because of overlap of the Stillwater sheep range.

Alternative 4A: This Management Area is not leased under this alternative. There are no effects.

Alternative 5: About ten percent of the high hazard and fragile soils would by protected by an NSO for riparian areas. The remaining 90 percent would be covered by standard terms. Where fragile soils could not be mitigated by standard terms, reclamation would be more difficult, costly, and time consuming with a higher potential for offsite sedimentation and water erosion until reclamation is successful.

Riparian Areas

Alternatives 2-4, 5: An NSO stipulation would be applied, so there would be no environmental impacts.

Alternative 4A: This Management area is not leased under this alternative. There are no effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Bighorn Sheep

Alternatives 2 and 4A: Selection of any of these alternatives would result in not leasing 100 percent (940 acres) of this management area. There would be no direct effects.

Alternatives 3 and 4: Under these alternatives, 100 percent of the winter/spring home range used by the Stillwater Bighorn Sheep herd, would receive a NSO stipulation. No direct or indirect effect to wildlife resources which use this area would be anticipated.

Alternative 5: Via this alternative, the Stillwater Bighorn Sheep winter/spring home range, contained in this management area, would receive both a NSO and a TL stipulation. About 9 percent of this seasonal home range would be experience a NSO stipulation. The remaining 91 percent of the Stillwater Bighorn Sheep home range, contained within this management area, would receive a TL stipulation. Under the terms of the lease, ground disturbances associated with oil and gas activities would not be permitted from November 1 to June 1 each year.

It is anticipated that this level of resource protection would be sufficient to minimize effects to wildlife values in this management area.

This alternative affords the bighorn sheep within this management area the least amount of resource protection of any of the action alternatives.

Issue #6: Roadless (Map 2)

Alternative 2: Under this alternative 640 acres, 68 percent, of the area will not be leased for bighorn sheep protection. The remaining 32 percent will be leased with an NSO stipulation. There will be no environmental effects.

Alternative 3, 4: The roadless area would be leased with NSO stipulation for other resources. Therefore, there would be no environmental impacts.

Alternatives 4A: Under this alternative the management area would not be leased, so there would be no environmental impacts.

Alternative 5: About ten percent of the roadless area would be protected by an NSO stipulation for riparian areas. The remainder would be leased using standard terms. This portion of the roadless area may lose its roadless character if oil and gas development occurs, due to traffic noise, smells, and visual intrusions. If developed, the roads would allow hunting traffic access to increase.

Cumulative Effects

Issue #2: Fish and Wildlife - When added to existing and planned livestock grazing and mining activities, this action could cumulatively affect the carrying capacity and nutritional forage base of Stillwater bighorn sheep herd through vegetation removal, increased human disturbance during the critical winter season, or through fertilization and plant species modification during reclamation.

4.2.2.4 MA C : PALISADES

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: An NSO stipulation would be applied to all high hazard and fragile soils, so there are no environmental effects.

Alternative 5: Standard lease terms would be applied to high hazard and fragile soils. However, about 18 percent would be protected by NSO for prairie falcon and riparian areas. Where fragile soils on the remaining 220 acres could not be mitigated by the 200-meter offset and the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plant

Alternatives 2-4A: A lease notice would be applied (Appendix E). However, the sensitive plant habitat would be covered by an NSO stipulation for fragile soils, so there would be no environmental effects.

Alternative 5: A lease notice would be applied (Appendix E). However, about 14 percent of the sensitive plant habitat would be covered by an NSO stipulation for protection of the prairie falcon and riparian areas. The remaining 86 percent of the sensitive plant habitat would have standard term protection.

Riparian Areas

Alternatives 2-5: An NSO stipulation would be applied, so there would be no environmental impacts.

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Prairie Falcon

Alternatives 2-4A: Under these alternatives, the entire management unit, would receive a NSO stipulation. Under the terms of a NSO lease for these alternatives, ground disturbances associated with exploration, such as pad placement would be precluded. This level of resource consideration would produce no effects.

Alternative 5: Via this alternative, the area within 0.25 miles of the known prairie falcon nest would receive a NSO stipulation. This would result in approximately 90 acres of NSO leasing within the management area. This level of resource protection would not be anticipated to sufficiently protect this resource. Disturbances associated with oil and gas activities would be detectable by the nesting falcon.

Moose

Alternatives 2-4A: Under these alternatives, the entire management unit, including 100 percent of the winter/spring home range used by the Palisades Moose herd, would receive a NSO stipulation. There would be no effects to the moose herd.

Alternative 5: Under this alternative, the winter/spring home range used by the Palisades Moose herd would receive two different levels of stipulations. Approximately 9 percent of the winter/spring home range would receive a NSO stipulation. The remaining portion, approximately 91 percent, of winter/spring home range used by the Palisades Moose herd would be leased with a TL stipulation. Under the terms of the lease, ground disturbances associated with oil and gas activities would not be permitted from October 15 to June 15 each year. These levels of resource protection would be sufficient to prevent or minimize direct or indirect effects to moose which occupy this management area.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: NSO stipulation would be applied to all slopes over 40 percent, so there would be no effects on the visual quality.

Alternative 4: The entire area would be covered by an NSO stipulation for wildlife. Therefore, there would be no effect on the visual quality.

Alternative 5: About 26 percent of the viewing area, 12 percent of the management area, would be covered by NSO stipulations for prairie falcon and riparian areas. The remaining 74 percent of the viewing area could be occupied by oil and gas activities. Where that occurs, views from offsite may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Cumulative Effects

Issue #3: Aesthetics - For alternative 5, oil and gas exploration activities could affect visual quality cumulatively with other projects, such as aspen stand manipulation. This would be generally for less than five months (Appendix B). All reclaimed sites may be noticeable until vegetation re-establishes. Typically, this would be one year for grassland sites and 5-10 years for timbered sites. The changes to the existing visual condition from aspen manipulation may be noticeable for 5-10 years.

4.2.2.5 MA C : LINE CREEK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: A combination of not available decision and a NSO stipulation will be applied to the 3,880 acres of high hazard and fragile soils, so there will be no environmental effects.

Alternative 5: About three percent of the high hazard and fragile soils area would be covered by NSO stipulations for eagles and riparian areas. The remaining 97 percent would be leased with standard terms. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternatives 2-4: While a lease notice would be applied to sensitive plant habitat (Appendix E), the 270 acres of sensitive plant habitat would be covered by NSO stipulations for other resource needs. Therefore, there would be no environmental impacts.

Alternative 4A: A combination of 80 acres of NSO and 190 acres of not available will protect this resource under this alternative. Therefore, there would be no environmental impacts.

Alternative 5: A lease notice would be applied to this habitat (Appendix E). Two stipulations would apply to the area. About 210 acres would be protected by NSO stipulation for riparian and eagles. The remaining 60 acres would be standard terms.

Riparian Area

Alternatives 2-5: All 520 acres of riparian areas would be protected with either a NSO stipulation or a not available decision, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Golden Eagles

Alternatives 2, 3, and 4: Under these alternatives, the entire management area would be leased with a NSO stipulation for eagles and other resources. This level of resource consideration would result in no environmental effects to eagles.

Alternative 4A: Selection of this alternative would lease 480 acres of the area within a 0.50 mile radius of the golden eagle nest in this management area with a NSO stipulation. This level of resource protection may or may not provide sufficient consideration to reduce or minimize direct and indirect effects to continued use of this golden eagle nest site.

Alternative 5: Under this alternative, the 110 acre area within a 0.25 mile radius surrounding the known eagle nest location would receive a NSO stipulation. This would not afford sufficient protection for this resource. Typically, eagles are susceptible to disturbance during nest use.

Elk

Alternatives 2, 3, and 4: Via these alternatives, 100 percent of all elk home ranges within this management unit would receive a NSO stipulation. Additionally, 800 acres of the core of this management area, that area which can not be accessed by directional drilling from outside the management area, would not be administratively available. This would include the summer/fall home range and winter/spring home range utilized by the Line Creek Elk herd. In some areas within the management unit these seasonal home ranges over lap. Therefore, no direct or indirect effects to the wildlife resources which inhabit this portion of the management area would be anticipated. It is anticipated that these alternatives, would reduce or minimize direct or indirect effects to elk within this management unit.

Alternative 4A: Selection of this alternative would provide three levels of consideration for the Line Creek Elk winter/spring and summer/fall home ranges within this management area. Additionally, the "core" of this management area would be available for leasing.

Approximately 70 percent of the winter/spring home range used by the Line Creek herd would be leased with a NSO stipulation. The remaining 30 percent of this seasonal home range would be leased with a TL stipulation. Under the terms of the lease, occupation of this seasonal home range would not be allowed from November 30 to July 1 each year by oil and gas activities. Selection of this alternative would be anticipated to prevent or minimize direct and indirect effects to use of the winter/spring home range by the Line Creek Elk herd.

Additionally, selection of this alternative, the summer/fall home range used by the Line Creek Elk herd within this management area would receive three levels of resource consideration. Approximately 17 percent of this seasonal home range would not be administratively available for leasing. An additional 83 percent of this range would be leased with a NSO stipulation. Selection of this alternative would be anticipated to provide sufficient resource consideration to prevent or minimize direct and indirect effects to the Line Creek Elk herd during their occupation of the summer/fall home range.

Alternative 5: Under this alternative the entire management area would be available for leasing. The core of the management area which was precluded from lease consideration in alternatives 1 through 4 would not exist under this alternative. The winter/spring and summer/fall home ranges used by the Line Creek Elk herd, both located in this management unit, would receive a combination of NSO and TL stipulations. Approximately 360 acres or 4 percent of these two seasonal home ranges would receive a NSO stipulation due to either riparian or eagle nest buffer considerations. Additionally, overlapping summer/fall and winter/spring TL stipulations creates 3,190 acres of NSO area. Approximately 6,360 acres, 64 percent of these seasonal home ranges, would receive a TL stipulation. The time of restricted surface occupation would be from November 30 to July 1 for winter/spring ranges, and from June 1 to November 1 on summer/fall ranges. This combination of stipulations should prevent or minimize effects to the elk herds.

Bighorn Sheep

Alternatives 2, 3, and 4: Under these alternatives, 100 percent of winter/spring home range utilized by the Rock Creek Bighorn Sheep herd would receive a NSO stipulation. This level of resource consideration should result in reduced or minimum direct or indirect effects to wildlife resources which use this area. These alternatives afford the Rock Creek Bighorn Sheep herd a great degree of resource protection.

Alternative 4A: Selection of this alternative would provide two levels of resource consideration for the winter/spring range utilized by the Rock Creek

Bighorn Sheep herd. Approximately 96 percent of this home range would not be administratively available for leasing. The mineral resources under this area would not be accessible, however, the land surface could experience ground disturbances associated with oil and gas exploration, development, and production. The remaining four percent of this seasonal home range would be available and leased with a NSO stipulation. It is anticipated that this level of resource consideration is sufficient to reduce or minimize direct and indirect effects to the Rock Creek Bighorn Sheep herd within this management area.

Alternative 5: Selection of this alternative would lease winter/spring home ranges with a NSO and TL stipulation combination. Approximately five percent of the Rock Creek Bighorn Sheep winter/spring home range would experience NSO leasing. Approximately 25 percent of the Rock Creek Bighorn Sheep winter/spring home range would be leased with a TL stipulation. Use and occupation of this habitat, by oil and gas related activities would be precluded from November 1 to July 1. The remaining 70 percent would be standard terms.

Mountain Goats

Alternatives 2, 3, and 4: Under these alternatives, 100 percent of the 3,620 acre winter/spring home range utilized by the Line Creek Mountain Goat herd would receive a NSO stipulation. Minimum direct or indirect effects to wildlife resources which use this area would be anticipated. These alternatives afford the Line Creek Mountain Goat herd a great degree of resource protection.

Alternative 4A: Selection of this alternative would provide four levels of resource consideration to the year long home range used by the Line Creek Mountain Goat herd. Under this alternative, approximately 23 percent of this home range would not be administratively available for leasing. Approximately 76 percent of this home range would be leased with a NSO stipulation. Finally, one percent of the year long home range utilized by the Line Creek Mountain Goat herd would be leased with standard terms. Occupation of this area, by oil and gas activities, would be expected to exert impacts beyond the area leased with standard terms.

This alternative, taken as a whole, would be expected to provide sufficient resource consideration to reduce or minimize adverse direct and indirect effects to the Line Creek Mountain Goat herd.

Alternative 5: Under this alternative, habitat utilized by the Line Creek Mountain Goat herd would be leased with three levels of resource considerations. Approximately four percent of the year long home range used by the Line Creek Mountain Goat herd would be leased with a NSO stipulation. Approximately 72 percent of the home range used by this herd of mountain goats would be leased with a TL stipulations due to Line Creek Elk winter/spring and summer/Fall considerations. Therefore, the restricted time of surface occupation would not necessarily provide protection to the Line Creek Mountain Goat herd which utilizes their home range on a yearlong basis. Finally, approximately 24 percent of the year long home range for the Line Creek Mountain Goat herd would be leased with standard terms. Recent studies conducted on mountain goats in this area indicate that the Line Creek herd utilizes the same habitat throughout the year. Typically mountain goat avoid areas which contain disturbances caused by human activities. Selection of this alternative would have adverse direct and indirect effects to the Line Creek Mountain Goat herd.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4: The entire 6,060 acres of available area in this management area would be covered by an NSO stipulation of wildlife, so there would be no impact to the view. Additionally, 480 acres of not available area are within the management area.

Alternative 4A: The area has 5,430 acres of NSO and 1,110 acres of not available so there would be no effect to the visual resource.

Alternative 5: About two percent of the area would be covered by an NSO stipulation to protect riparian areas. The remaining 97 percent would be available for occupancy by oil and gas activities with standard terms. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing. Emissions from well sites would be localized, and would be essentially invisible to observers from main road viewing points or from the Absaroka-Beartooth Wilderness Wilderness.

Issue #4: Recreation (Map 6)

Alternatives 2-4: The entire management area would be covered by an NSO stipulation of wildlife, so there would be no impact to the recreation trails.

Alternative 4A: Under this alternative, for areas where trails are located, about two percent of the trails are under a not available area, 89 percent are in NSO areas, another eight percent is under timing for elk and the remaining one percent is in a standard term area. The small amount in the standard term area may be affected by noise, smells and visual intrusions. The remainder of the area would have less impact on trail users as distance increases from activities.

Alternative 5: Approximately ten percent of the trail and buffer area would be covered by NSO stipulations protecting the eagle nest and riparian areas. The remaining 82 percent would be covered by TL stipulations for the various wildlife species. Trail users may be able to see or hear oil and gas activities outside of the periods covered by TL stipulations. Hunters would benefit from increased access.

Issue #5: Cultural Resources

Alternatives 2-4A: The Line Creek Ranger Station and one traditional cultural property are protected by their location within the core area for this management under Alternatives 2 through 4. Under 4A, these resources are protected by an NSO stipulation for the site area, and for 1/4 mile from the site boundary. The buffer for the traditional cultural property may change upon further consultation with the Crow tribe. There would be no direct effects to these sites.

Alternative 5: Under this alternative, the Ranger Station and the cultural site are protected by an NSO stipulation for the site area and for 1/4 mile from the site boundary. The buffer for the traditional cultural property may change upon further consultation with the Crow tribe. There would be no direct effects to these sites.

Issue #6: Roadless (Map 2)

Alternatives 2-4: The entire management area would be covered by an NSO stipulation of wildlife and a small (80 acre) portion that is no available, so there would be no impact to the roadless character of the area.

Alternative 4A: Approximately 32 percent of the roadless area is not available for lease, another 32 percent is NSO and the remaining 36 percent is under TL stipulation for wildlife resources. In those areas of TL where development may occur there would be loss of the roadless character from possible road intrusion and related noise and human activities. If developed, the roads could allow hunting traffic to increase.

Alternative 5: Approximately five percent of the roadless area would be covered by an NSO stipulation for protection of riparian areas. The rest would be leased using TL or standard terms which allow development. Where occupancy occurs, the roadless character would be affected. The area would experience added traffic noise and visual intrusion. If developed, the roads could allow hunting traffic to increase.

Cumulative Effects

Issue #1: Soils and Vegetation - The effects of activities under this proposal, combined with those at the Phillips Ruby Well, may increase the potential of sedimentation into nearby streams and riparian areas until reclamation on the Phillips Ruby Well is completed (scheduled for 1994).

Issue #3: Aesthetics - Phillips Ruby Well pad and access road may affect the existing visual condition for two to four more years until reclamation is completed. The use of prescribed burning to enhance elk winter range may also affect the existing visual condition. The changes to the existing visual condition from this type of project may be noticeable for 5-15 years. Oil and gas exploration activities could add cumulatively to these visual impacts. All reclaimed sites may be noticeable until vegetation re-establishes. Typically, this would be one year for grassland sites, 5-10 years for timbered sites, and an unknown period of time for alpine sites.

4.2.2.6 MA C : COOKE CITY

Alternative 4A: Under this alternative, this management area will not be leased so there would be no environmental effects to any resources.

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4: Approximately 4,290 acres, 100 percent, of the high hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects to this resource.

Alternative 5: An NSO stipulation would be applied to approximately eleven percent of the fragile soils for protection of riparian areas. There will be no effects to fragile soils within the NSO stipulated area. Standard terms would be applied to the remaining 89 percent. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternatives 2-4: A lease notice would be applied to sensitive plant habitats (Appendix E). However, the entire management area would be covered by NSO stipulations for wildlife or other resources, so there would be no environmental effects. Additionally, about 630 acres of Grizzly MS 1 habitat that is not leased overlaps the plant habitat.

Alternative 5: A lease notice would be applied to sensitive plant habitats (Appendix E). Under this alternative two stipulations would apply. About four percent of the sensitive plant habitat would be NSO. The remainder composed of 780 acres of TL and 1,240 acres of standard terms would be administered as standard terms.

Riparian Areas:

Alternatives 2-4, 5: Fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Fisheries

Alternatives 2-4, 5: This area contains a population of Cutthroat Trout believed to be genetically pure Yellowstone sub-species. Under all alternatives, either an NSO or ST stipulation would apply, for either riparian and/or Yellowstone cutthroat trout mitigation of effects. Alternative 2 contains a small area of not leased for Grizzly MS 1 and Alternative 4A is totally not leased. Not leased area would have no effects to Yellowstone cutthroat trout. In addition, lease notices would be issued for situations where Yellowstone cutthroat trout are presumed to occur. A detailed survey and inventory of all Yellowstone cutthroat trout populations and habitats will be required for all potential developed sites. It is expected that all aquatic flora and fauna will benefit from either the riparian and/or Yellowstone cutthroat trout mitigation. These stipulations are intended to provide mitigation to avoid most of the possible effects previously described.

Grizzly Bears

Alternatives 2-4: Under this alternative 100 percent of both MS1 and MS2 habitat would be NSO for wildlife as specified in the Forest Plan. No environmental effects to grizzly bear are anticipated.

Alternative 5: Via this alternative, MS1 grizzly bear habitat would receive two different types of stipulations. Approximately 24 percent of MS1 habitat would be leased with a NSO stipulation. Under the terms of a NSO lease for this alternative, ground disturbances associated with exploration, such as drill pad construction would be precluded. The remaining 76 percent of MS1 habitat would be leased with a TL stipulation. Under the terms of the lease, ground disturbances associated with oil and gas activities would not be permitted from June 1 to November 1 each year.

Additionally, via this alternative MS2 grizzly bear habitat within this management area would experience both NSO and standard term resource considerations. Approximately 13 percent of MS2 habitat would be leased with a NSO stipulation. The remaining 87 percent of MS2 habitat within this management area would be leased with standard terms. Therefore, the land could experience ground disturbances associated with oil and gas activities. Under the provisions of standard terms, Threatened and Endangered Species are afforded any level of protection necessary in order to prevent unacceptable impacts to the species. This may include no occupancy of a lease, even if the lease was purchased without a NSO provision.

Issue #4: Recreation (Map 6)

Alternatives 2-4: NSO stipulations for other resources would be applied to the entire area (no leasing in grizzly bear habitat MS1 under Alternative 2), so there would be no effects to recreational trails.

Alternative 5: About 12 percent of the trail system and ¼ mile buffer would be covered by an NSO stipulation for riparian area protection. An additional 47 percent of the trail and buffer area would have a TL stipulation for June 1 to November 1 annually for grizzly bear protection. Standard terms would apply to the remaining 41 percent of the trail system. Trail users may be able to see or hear oil and gas activities outside of the periods covered by TL stipulations, or where the 200-meter offset and 60-day delay of the standard lease terms would not be able to remove or screen oil and gas activities. Hunters would benefit from increased access.

Issue #6: Roadless (Map 2)

Alternatives 2-4: NSO stipulations for other resources would be applied to the entire area (no leasing in grizzly bear habitat MS1 under Alternative 2), so there would be no effects to roadless areas.

Alternative 5: An NSO stipulation would be applied to approximately 14 percent of the roadless area for riparian area protection area. Another 42 percent would be under TL stipulation for Grizzly bear MS1 during the summer months. The rest would be leased using standard terms. Where occupancy occurs, the roadless character of the area would be affected. This area would experience traffic noise and possible visual intrusions. If developed, the roads would allow increased hunting access.

Cumulative Effects

Issue #2: Fish and Wildlife - Grizzly bear use of this management area could be cumulatively affected by increased human activity. This could result due to oil and gas activity, existing human activities associated with the New World Gold Mine, dispersed recreation (both summer hikers and fall hunting), proximity to vehicle traffic entering and leaving Yellowstone National Park, snowmobiling and skiing, and existing use of trailheads.

4.2.3 D MANAGEMENT AREAS:

The following table 4.14 displays resource acreage information by alternative and stipulation for all D Management Areas. Individual Management Area information is found in Chapter 3.2.3 and table 3.23.

Table 4.14
Resource Acres by Alternative and Stipulation (D Mgmt. Areas)
(Total Acres 50,060)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-29,500	NL-6,920 NSO-22,580	NSO-29,500	NSO-29,500	NA-6,920 NSO-22,580	NSO-1,140 ST-28,360
Sensitive Plant Habitat	NL-7,750	NL-6,220 NSO-1,490 LN-40	NSO-7,700 TL-10 LN-40	NSO-7,590 TL-120 LN-40	NA-6,220 NSO-1,470 TL-20 LN-40	NSO-370 LN-7,380
Sensitive Plant Sites	NL-10	NL-10	NSO-10	NSO-10	NA-10	LN-10
Riparian	NL-1,830	NL-330 NSO-1500	NSO-1,830	NSO-1,830	NA-330 NSO-1500	NSO-1,830
Elk Home Range						
Meyers Cr Winter/Spring	NL-1,270	NSO-1,270	NSO-650 TL-620	NSO-540 TL-730	NSO-540 TL-730	NSO-60 ST-1,210
Picket Pin Winter/Spring	NL-440	NSO-440	NSO-300 TL-140	NSO-300 TL-140	NSO-300 TL-140	ST-440
Line Creek Winter/Spring	NL-2,420	NL-2,420	NSO-2,420	NSO-2,300 TL-120	NA-2,420	NSO-20 ST-2,400
Line Creek Summer/Fall	NL-6,160	NL-6,160	NSO-6,160	NSO-5,690 ST-470	NA-6,160	NSO-300 ST-5,860
Black Butte Summer/Fall	NL-8,160	NSO-8,160	NSO-6,120 TL-2,040	NSO-2,880 ST-5,280	NSO-3,200 TL-4,960	NSO-470 ST-7,690
Luther Elk Summer/Fall	NL-180	NSO-180	NSO-150 TL-30	NSO-150 TL-30	NSO-150 TL-30	ST-180

	1	2	3	4	4A	5
Moose Home Range						
Lodgepole Winter/Spring	NL-730	NSO-730	NSO-280 TL-450	NSO-280 TL-450	NSO-280 TL-450	NSO-80 ST-650
McDonald Basin Winter/ Summer	NL-5,530	NSO-5,530	NSO-3,300 TL-2,230	NSO-1,300 TL-4,230	NSO-1,300 TL-4,230	NSO-340 ST-5,190
Palisades Winter/Spring	NL-180	NSO-180	NSO-60 TL-120	NSO-60 TL-120	NSO-60 TL-120	NSO-10 ST-170
Bighorn Sheep Home Range						
W. Rosebud Winter/ Spring	NL-3,330	NSO-3,330	NSO-3,290 TL-40	NSO-3,030 TL-300	NSO-3,030 TL-300	NSO-280 ST-3,050
Rock Creek Winter/Spring	NL-680	NL-680	NSO-680	NSO-680	NA-680	ST-680
Mountain Goat Home Range						
Line Creek Summer/ Winter	NL-520	NL-520	NSO-520	NSO-520	NA-520	ST-520
Visuals	NL-23,970	NL-4,610 NSO-19,360	NSO-23,970	NSO-23,970	NA-4,610 NSO-19,360	NSO-620 ST-23,350
Visual Corridor	NL-700	NSO-670 CSU-30	NSO-670 CSU-30	NSO-670 CSU-30	NSO-670 CSU-30	NSO-30 ST-670
Trails	NL-9,110	NL-4,000 NSO-5,030	NSO-8,290 TL-750 CSU-70	NSO-7,580 TL-520 ST-1,010	NA-4,000 NSO-3,900 TL-480 ST-730	NSO-290 ST-8,820
Cultural	NL-40	NSO-40	NSO-40	NSO-40	NA-40	NSO-40
Roadless	NL-29,160	NL-11,030 NSO-18,130	NSO-29,160	NSO-23,800 TL-890 ST-4,470	NA-11,030 NSO-13,600 TL-3,290 ST-1,240	NSO-1,200 ST-27,960

4.2.3.1 MA D: PICKET PIN

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: NSO stipulations will be applied to all 17,050 acres of high hazard and fragile soils, so there would be no environmental effects.

Alternative 5: Less than four percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remaining 96 percent of the high hazard and fragile soils area would be leased with standard terms. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternatives 2-4A: Sensitive plant habitat would be covered by an NSO stipulation for fragile soils and riparian areas, so there would be no environmental effects.

Alternative 5: A lease notice will be applied to sensitive plant habitat (Appendix E).

Riparian Areas

Alternatives 2-5: NSO stipulation would be applied to all riparian areas, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: This area provides seasonal home ranges for 2 different elk herds. Under this alternative, 100 percent of all elk seasonal home ranges within this management area would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize direct or indirect effect to wildlife resources which use this area.

Alternatives 3-4A: Under these alternatives, approximately 52 percent (Alternative 3) to 42 percent (Alternatives 4 and 4A) of the Meyers Creek Elk winter/ spring home range would receive a NSO stipulation.

The remaining portion of this seasonal home range, approximately 48 percent (Alternative 3) to 58 percent (Alternatives 4 and 4A) would receive a Timing Limitation stipulation. Surface occupation of this portion of the Meyers Creek Elk winter/spring ranges would be precluded from November 30 to July 1 each year.

The Picket Pin Elk winter/spring range would also experience two different types of stipulations. Approximately 68 percent of this home range would receive a NSO stipulation. Under the terms of a NSO stipulation for this alternative, ground disturbances associated with exploration, such as drill pad placement would be precluded. The remaining 32 percent would receive a TL stipulation. Under the terms of the lease, occupation of the lease would be prevented from November 30 to July 1 each year.

It is anticipated that this level of resource consideration would be sufficient to reduce or minimize adverse direct and indirect effects to the elk herds during their period of occupation.

Alternative 5: Under this alternative, approximately five percent of the Meyers Creek winter/spring home range would receive a NSO stipulation. The remaining 95 percent of this seasonal home range would receive standard terms. All (100 percent) of the Picket Pin Elk winter/spring home range would receive standard terms.

In all elk herds which inhabit this management unit, seasonal occupation of home ranges occurs for a period of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of elk from these seasonal home ranges to sub-optimum range would be anticipated.

Moose

Alternative 2: Under this alternative, 100 percent of the winter/spring home range utilized by the Lodgepole Creek Moose herd would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize direct or indirect effects to moose which use this area.

This alternative affords moose within this management area the most resource protection of any of the action alternatives.

Alternatives 3-4A: Selection of this alternative would lease the winter/spring home range utilized by the Lodgepole Creek Moose herd with two different types of stipulation. Approximately 40 percent of this seasonal home range would receive a NSO stipulation. The remaining 60 percent of this seasonal home range would be leased with a TL stipulation. Under the terms of the lease, areas covered by a TL stipulation could not experience oil and gas activities from October 15 to June 15 each year.

It is anticipated that this level of resource consideration would be sufficient to reduce or minimize adverse direct and indirect effects to the Lodgepole Creek Moose herd during their period of occupation.

Alternative 5: Under this alternative, approximately 11 percent of the Lodgepole Creek Moose winter/spring home range would receive a NSO stipulation. The remaining 89 percent of this moose home range, would receive standard terms.

Moose which use this management area, do so for periods in excess of 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. At a minimum, displacement of moose from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: All slopes greater than 40 percent, as well as some additional areas of riparian and fragile soils, would be leased with NSO stipulations. There would be no effect on the visually sensitive areas.

Alternative 5: Except for a very small portion of the area covered by NSO stipulations for riparian areas and cultural resources, 98 percent of the slopes over 40 percent, or about 58 percent of this management area would be available for occupancy by oil and gas activities. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Alternative 2: The trail system and its ¼ mile buffer would be covered by an NSO stipulation, so there would be no environmental effects to the trail system.

Alternative 3: Approximately 84 percent of the trails and 0.25 mile buffer would be NSO for slopes over 40 percent and the remaining 16 percent would be TL stipulation. Occupancy could occur on the TL area.

Trail users would possibly hear and see oil and gas development activities as they hike this portion of the trail system. Use of the standard term 200-meter offset and the 60-day delay would lessen possible disturbances.

Alternative 4: NSO stipulations would be applied to approximately 75 percent of the existing trail system and its ¼ mile buffer for other resource protection. Recreationists would not experience any changes in this area. TL and standard terms would be applied to the remaining 25 percent of the existing trail system. Trail users would possibly hear and see oil and gas development activities as they hike this portion of the trail system. Use of the 200-meter offset and the 60-day delay would lessen possible disturbances

Alternative 5: NSO stipulation would be applied to approximately five percent of the existing trail system for protection of riparian areas and cultural sites. Standard terms would be applied to the remaining 95 percent. Trail users would possibly hear and see oil and gas development activities as they hike these trails. Use of the 200-meter offset and the 60 day-delay would lessen possible disturbance to trail users.

Issue 5: Cultural Resources

Alternatives 2-4A: The two traditional cultural properties that are located in this management area would be protected by an NSO stipulation for the site and for ¼ mile from the site boundary. These buffers may change upon consultation with the Crow tribe. There would be no direct impact to the sites.

Alternative 5: The two traditional cultural properties that are located in this management area would be protected by an NSO stipulation for the site and a CSU stipulation for ¼ mile from the site boundary. These buffers may change upon consultation with the Crow tribe. There would be an increased possibility for impact to these sites over the other alternatives.

Issue 6: Roadless (Map 2)

Alternatives 2-3: An NSO stipulation would be applied to the roadless area, so there would be no environmental impacts.

Alternative 4-4A: NSO stipulations would be applied to approximately 88 percent of the roadless area for other resource protection. There would be no effect to the roadless character on this portion of the area. Standard terms would apply to the remaining 12 percent. Where occupancy occurs, the roadless character of the area would be affected. This area would experience traffic noise and possible visual intrusions. If developed, the roads would allow increased hunting access..

Alternative 5: Less than three percent of the roadless area would be covered by an NSO stipulation for riparian area protection. The remaining 97 percent would be leased using standard terms. The roadless character of the area would be affected where mitigation is not possible through the 200-meter offset allowed by the standard terms. Where occupancy occurs, the roadless character of the area would be affected. This area would experience traffic noise and possible visual intrusions. If developed, the roads would allow increased hunting access.

Cumulative Effects

Issue #3: Aesthetics - Oil and gas exploration activities could effect visual quality cumulatively with other projects, such as aspen stand manipulation, conifer encroachment treatment and mining activities. This would be generally for less than five months (Appendix B). All reclaimed sites may be noticeable until vegetation re-establishes. Typically, this would be one year for grassland sites and 5-10 years for timbered sites. The changes to the existing visual condition from aspen manipulation may be noticeable for 5-10 years.

Issue #4: Recreation - Oil and gas activities, in combination with the proposed Pass Creek trail re-routing, Lodgepole and Dead Indian trailhead construction, and Mt. Washburn Trailhead construction and trail re-routing, may cumulatively affect recreational use patterns.

4.2.3.2 MA D : FISHTAIL

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: High hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: An NSO stipulation for riparian area protection would cover approximately seven percent of the fragile soils in this area. Standard terms would be applied to the remaining 93 percent. Where fragile soils could not be mitigated by the 200-meter offset or the 60-day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful. There would also be a potential for wind erosion until reclamation is successful.

Sensitive Plants

Alternatives 2: All 150 acres of the sensitive plant habitat would be covered by NSO stipulations for protection of other resources, so there would be no environmental effects.

Alternative 3: A lease notice would be applied to sensitive plant habitat (Appendix E). About 93 percent of this habitat would be covered by NSO stipulations for protection of other resources.

Alternative 4-4A: A lease notice would be applied to sensitive plant habitat (Appendix E). About 87 percent of this habitat would be covered by NSO stipulations for protection of other resources.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Riparian Areas

Alternatives 2-5: An NSO stipulation would be applied to riparian areas, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: Under this alternative, 100 percent of the summer/fall home range used by the Black Butte Elk herd would receive a NSO stipulation. It is anticipated that this level of resource consideration would result in minimal direct or indirect effect to elk which utilize this management area.

Alternatives 3 and 4A: Under these alternative, the summer/fall home range used by the Black Butte Elk would receive two types of stipulations. In order, approximately 75 and 39 percent of this seasonal home range would receive a NSO stipulation from other resources. The remaining 25 and 61 percent of this seasonal home range would receive a TL stipulation with occupation of this portion of the lease precluded from June 1 to November 1 each year. It is anticipated that this level of resource protection would be sufficient to reduce or minimize direct or indirect impacts to the elk which seasonally occupy this management area.

Alternatives 4 and 5: Under these alternatives, the summer/fall home range used by the Black Butte Elk herd would receive two levels of resource considerations. In order, approximately 35 and six percent of the occupied summer/fall home range would be leased with a NSO stipulation. The remaining 65 and 94 percent of the seasonal home range would receive standard terms.

The Black Butte Elk herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of elk from these seasonal home ranges to sub-optimum range would be anticipated.

Moose

Alternative 2: Under this alternative, 100 percent of the McDonald Basin Moose winter/spring home range would receive a NSO stipulation. It is anticipated that this level of resource consideration would result in minimal direct or indirect effect to moose which inhabit this management area.

Alternatives 3-4A: Under these alternatives the McDonald Basin Moose winter/spring home range with would receive two types of stipulations. In order, approximately 60, 24, and 24 percent of this home range would receive a NSO stipulation. The remaining 40, 76, and 76 percent of this home range would receive a TL stipulation. This area, which serves as winter/spring habitat (lower elevation, adjacent to private land) would be precluded from surface occupation by oil and gas activities, from October 15 to June 15. It is anticipated that this level of resource protection would be sufficient to reduce direct or indirect impacts to the moose which seasonally occupy the management area.

Alternative 5: Via this alternative, the year long home range used by the McDonald Basin Moose herd would receive two levels of resource considerations. Approximately six percent of this home range would receive a NSO stipulations. The remaining 94 percent would receive standard terms.

The McDonald Basin Moose herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Bighorn Sheep

Alternative 2: Under this alternative, 100 percent of the winter/spring home range utilized by the West Rosebud Bighorn Sheep herd would receive a NSO stipulation. It is anticipated that this level of resource consideration would result in minimal direct or indirect effect to moose which inhabit this management area.

Alternatives 3-4A: Under these alternatives, the West Rosebud Bighorn Sheep winter/spring home range would receive two types of stipulations. In order, approximately 99, 91, and 91 percent of this seasonal home range would receive a NSO stipulation. The remaining seasonal home range would receive a TL stipulation where occupation of this portion of the lease would be prevented from November 1 to May 1 each year.

It is anticipated that this level of resource consideration would be sufficient to prevent or minimize adverse direct and indirect effects to the West Rosebud Bighorn Sheep herd during the time which they occupy this seasonal home range.

Alternative 5: Under this alternative, the winter/spring home range used by the West Rosebud Bighorn Sheep herd would receive two levels of resource considerations. Approximately 10 percent of the winter/spring home range used by this herd would experience a NSO stipulation. The remaining 90 percent would receive standard terms.

The West Rosebud Bighorn Sheep herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this seasonal home range. At a minimum, displacement of bighorn sheep from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: All areas with a 40 percent slope or greater and the visual corridor within this management area that is next to the developed recreation site in the adjacent management area would be leased with an NSO stipulation. Therefore, there would be no impact on the visually sensitive areas.

Alternative 5: About six percent of slopes greater than 40 percent would be covered by an NSO stipulation for riparian area protection. About five percent of the visual corridor would be protected with NSO for other resources. The remaining 94 percent of slopes over 40 percent and 95 percent of the visual corridor would be leased with standard terms, making it available for occupancy by oil and gas activities. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #6: Roadless (Map 2)

Alternatives 2-3: An NSO stipulation would apply to the roadless area, so there would be no environmental effects.

Alternative 4: NSO stipulation would be applied to approximately 60 percent of the roadless area for other resource protection. There would be no effect to the roadless qualities found within this area. Approximately three percent would be leased using TL stipulation. Where occupancy occurs, the roadless character would be affected, although TL stipulations for big game habitat would limit oil and gas activity during the summer recreational use period and only during the exploratory drilling period. The remainder (37 percent) would be standard terms. Where occupancy occurs, the roadless character would be affected. The area would experience added traffic noise and possible visual intrusions. If developed, added roads would allow hunting access.

Alternative 4A: NSO stipulation would be applied to approximately 60 percent of the roadless area for other resource protection. There would be no effect to the roadless qualities found within this area. Approximately 39 percent would be leased using TL stipulation. Where occupancy occurs, the roadless character would be affected, although TL stipulations for big game habitat would limit oil and gas activity during the summer recreational use period and only during the exploratory drilling period. The remainder, less than two percent, would be standard terms. Where occupancy occurs, the roadless character would be affected. The area would experience added traffic noise and possible visual intrusions. If developed, added roads would allow hunting access.

Alternative 5: An NSO stipulation would be applied to approximately eight percent of the roadless area for riparian area protection. Standard terms would apply to the remaining 92 percent. Where occupancy occurs, the roadless character would be affected. The area would experience added traffic noise and possible visual intrusions. If developed, added roads would allow hunting access.

Cumulative Effects

Issue #3: Aesthetics - Oil and gas exploration activities could affect visual quality cumulatively with other projects, such as aspen stand manipulation. This would be generally for less than five months (Appendix B). All reclaimed sites may be noticeable until vegetation re-establishes. Typically, this would be one year for grassland sites and 5-10 years for timbered sites. The changes to the existing visual condition from aspen manipulation may be noticeable for 5-10 years.

4.2.3.3: HYPOTHETICAL WELL SITE-DEAN DOME

The hypothetical Dean Dome Well Site would be located within this management area. The environmental effects of occupying this site are discussed below. This well site is located on high oil and gas development potential. Refer to Appendix A and B for more specific details.

Alternatives 2: The well site would not be occupied, so there would be no environmental effects for any of the resources.

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 3-5: The well site would not be located on any high hazard and fragile soils.

Sensitive Plants

Alternatives 3-5: Less than 25 acres of bunchgrass and forbs would be disturbed for pad construction and road construction/reconstruction. There are no known sensitive plant species occurring on the site. None of the effected area is known to be sensitive plant habitat. A lease notice would be applied for an area that extends ¼ mile beyond the drill site and ¼ mile either side of new road construction (Appendix E).

Riparian Areas

Alternatives 3-5: The well site would not be located in any riparian areas.

Issue #2: Fish and Wildlife Map 3, 4, 5 and 7)

Elk

Alternative 3-5: The area surrounding this location does not provide seasonal home range for the Black Butte Elk herd. No impacts to this elk herd would be anticipated.

Moose

Alternative 3 and 4A: Selection of this alternative would activate this well location. A TL stipulation would be in place due to McDonald Basin Moose winter/spring range consideration surrounding the well location. This TL stipulation would preclude occupation of the area during the time that the area is utilized by the McDonald Basin Moose herd, from October 15 to June 15. It is anticipated that this alternative would be sufficient to prevent direct or indirect effects to this moose herd.

Alternative 4 and 5: Selection of this alternative would activate this well location, leasing the area surrounding the RFD location with standard terms. This area comprises important winter/spring home range for the McDonald Basin Moose herd. The McDonald Basin Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. Selection of this alternative would be expected to result in adverse direct and indirect effects to moose which inhabit the area. At a minimum, displacement of moose from these seasonal home ranges to sub-optimum range would be anticipated.

Bighorn Sheep

Alternatives 3-5: The West Rosebud Bighorn Sheep herd does not inhabit the portion of the management area where the well site is located, during any season of the year. No direct or indirect effect to this herd would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternatives 3-5: Less than 25 acres would be disturbed. The site would appear heavily modified until reclamation activities are completed. The potential effects of emissions of the well site on visibility were evaluated with VISCREEN model (Air Quality Report, Planning File). The VISCREEN analysis indicated that the nitrogen dioxide and particulate emissions associated with well sites would have localized and very minimal impacts which would be essentially invisible to observers from main road viewing points or from the Absaroka-Beartooth Wilderness.

Issue #5: Cultural Resources

Alternatives 3-5: According to the site location model, the well site is within an area of low site density. On-the-ground survey of the location revealed no cultural resources. It is not adjacent or in view of any of the known traditional cultural properties or historic sites, so the location of this well site would not cause adverse impacts to these sites. There would be no direct impact to known sites.

Issue #7: Quality of Life

Alternatives 3-5: The SCREEN model (Air Quality Report, Project File) was used to compare the dispersion of well site emissions of the Dean Dome Well Site with National Ambient Air Quality Standards. All of the modeled concentrations for nitrogen dioxide and particulates would be well within Montana and National Ambient Air Quality Standards and considerably below Class II increment levels. Emission levels during production would be considerably less than exploration, with no anticipated adverse health effects. The primary potential air quality impacts would be from road dust particulates from vehicle travel. For this analysis, it was assumed that the Dean Dome well site would not be brought into production. Less than 25 acres of land would be disturbed and any impact to water quality from suspended sediments would be extremely small.

Cumulative Effects

Issue #7: Quality of Life - If wells were drilled within two miles of each other, some combination of emissions could occur. However, the projected well sites are sufficiently separated that, even if drilled simultaneously, cumulative air quality impacts would not occur.

4.2.3.4 MA D : BUTCHER CREEK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: High hazard and fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: An NSO stipulation would be applied to about six percent of the fragile soils within this management area for riparian area protection. Standard terms would be applied to the remaining 94 percent. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2-4A: A lease notice would be applied to sensitive plant habitat (Appendix E). However, since this area would be covered by NSO stipulations for sensitive soils and riparian area protection, there would be no environmental effects.

Alternative 5: A lease notice would be applied to all sensitive plant habitat (Appendix E). Approximately 16 percent of the high hazard and fragile soils are protected by NSO stipulation, the remainder have standard terms. A survey to determine if sensitive plants are present would be required before site occupancy.

Riparian Areas

Alternatives 3-5: An NSO stipulation would be applied to all riparian areas, so no environmental effects would occur.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: Under this alternative, 100 percent of the summer/fall home range, utilized by the Luther Elk herd, would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to minimize direct or indirect effects to elk which seasonally utilize this management area.

Alternatives 3 and 4A: Under these alternatives, the Luther Elk summer/fall home range would receive two different types of stipulations. Approximately 83 percent of this seasonal elk home range would experience a NSO stipulation. The remaining 17 percent of Luther Elk summer/fall home range would receive a TL stipulation with occupation of this portion of the seasonal home range prevented from June 1 to November 1 each year. This level of resource protection is anticipated to reduce or minimize direct and indirect effects to elk in this management area.

Alternative 4: Under this alternative, the Luther Elk summer/fall home range would receive two different types of stipulations. Approximately 83 percent of this seasonal elk home range would experience a NSO stipulation. The remaining 17 percent of Luther Elk summer/fall home range would be leased with standard terms.

The Luther Elk herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home range. Selection of this alternative would be anticipated to result in direct and indirect adverse effects to the Luther Elk herd. At a minimum, displacement of elk from this seasonal home range to sub-optimum range would be anticipated.

Alternative 5: Via this alternative, 100 percent of the summer/fall home range used by the Luther Elk herd would receive standard terms. The Luther Elk herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home range. Selection of this alternative would be anticipated to result in direct and indirect effects to the Luther Elk herd. At a minimum, displacement of elk from these seasonal home range to sub-optimum range would be anticipated. This alternative affords elk which inhabit this management area the least amount of resource protection of any of the action alternatives.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: All of the slopes over 40 percent would be leased with an NSO stipulation. In addition, about 73 percent of the visual corridor along East Rosebud Creek would be covered by an NSO stipulation for protection of sensitive soils. The remaining 27 percent of the East Rosebud Creek corridor would be subject to a CSU stipulation from 5/15 to 9/15 annually. This CSU stipulation is for a buffer that surrounds MA F East Rosebud. There would be little to no effect to these visually sensitive areas.

Alternative 5: About 20 percent of slopes over 40 percent would be covered by by NSO stipulation for riparian area protection. The rest of the steep slopes and the East Rosebud Creek corridor would be available for occupancy by oil and gas activities. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

4.2.3.5 MA D : PALISADES

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: An NSO stipulation will be applied to high hazard and fragile soils within this management area, so there would be no environmental effects.

Alternative 5: An NSO stipulation would be applied to approximately five percent of the fragile soils for riparian area protection. The remaining fragile soils would be leased with standard terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2-4A: A lease notice would be applied to sensitive plant habitat (Appendix E). However, about 92 percent of this habitat would be covered by NSO stipulations for other resource protection.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E). Less than two percent of this habitat would be covered by an NSO stipulation for riparian area protection.

Riparian Areas

Alternatives 2-5: An NSO stipulation would be applied to all riparian areas, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Moose

Alternative 2: Under this alternative, 100 percent of the Palisades Moose winter/spring home range would receive a NSO stipulation. No direct or indirect effect to moose which inhabit this management area would be anticipated.

Alternatives 3 and 4A: Under these alternatives, 33 percent of the Palisades Moose herd's winter/spring home range would receive a NSO stipulation. The remaining 67 percent of this moose seasonal home range would receive a TL stipulation with occupation of this area precluded from October 15 to June 15 each year. This level of resource protection should be sufficient to prevent or minimize direct and indirect effects to moose and their required habitats within this management area.

Alternative 4: Selection of this alternative, 33 percent of the Palisades Moose herd's winter/spring home range would receive a NSO stipulation. The remaining 67 percent of this moose seasonal home range would be leased with standard terms.

Moose which use the winter/spring range within this management unit, do so for periods of time exceeding 60 days. Relocation of the well site by 200 meters would not remove the disturbance activity from within the seasonal home range. Selection of this alternative would could result in direct and indirect effects to moose which inhabit this management area. At a minimum, displacement of moose from this seasonal home range to a sub-optimum range would be anticipated.

Alternative 5: Via this alternative, 100 percent of the winter/spring home range used by the Palisades Moose winter/spring range would receive standard terms. Moose which use the winter/spring range within this management unit, do so for periods of time exceeding 60 days. Relocation of the well site by 200 meters would not remove the disturbance activity from within the seasonal home range. At a minimum, displacement of moose from this seasonal home range to a sub-optimum range would be anticipated.

This alternative affords moose which inhabit this management area the least amount of resource protection of any of the action alternatives.

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: Areas with slopes over 40 percent would be leased with an NSO stipulation, so there would be no effect on these visually sensitive areas.

Alternative 5: All of the areas of slopes over 40 percent would be leased with standard terms, and would be available for occupancy by oil and gas activities. Where occupancy occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Alternative 2: About 85 percent of the existing recreational trails and their ¼ mile buffer would be covered by NSO stipulation for protection of other resources. The remaining 15 percent would be leased with a TL stipulation, restricting oil and gas activities between May 15 and September 15 annually. Oil and gas activities would not be evident to trail users during the highest recreational use period for the exploratory drilling phase.

Alternative 3: About 85 percent of the existing recreational trails and their ¼ mile buffer would be covered by NSO stipulation for protection of other resources. The remaining 15 percent would be leased with a CSU and TL stipulation. Some oil and gas activities may be evident from the trails, but effects would be minimal.

Alternative 4: About 85 percent of the existing recreational trails and their ¼ mile buffer would be covered by NSO stipulations for protection of other resources. The remaining 15 percent would be leased with standard terms. Trail users would possibly hear and see oil and gas development activities as they hike the portion of trails not covered by NSO. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to trail users.

Alternative 5: Less than five percent of the existing recreational trails and their ¼ mile buffer would be covered by an NSO stipulation for riparian area protection. The remaining 95 percent would be leased with standard terms. Where occupancy occurs, trail users would possibly hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to trail users.

4.2.3.6 MA D : LINE CREEK

Alternatives 2: All of this 11,700 acre Management Area would not be leased because visual concerns, so there would be no environmental effects.

Alternative 4A: This management area is not available under alternative 4A so there will be no environmental effect. This is an availability decision that requires a Forest Plan amendment if selected.

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 3-4: High hazard and fragile soils would be 100 percent NSO stipulation, so there would be no environmental effects.

Alternative 5: About two percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remaining 98 percent would be leased with standard terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternatives 3-4: A lease notice would be applied to sensitive plant habitats (Appendix E). Additionally, over 98 percent of the area is also within the NSO areas for high hazard and fragile soils or slopes over 40 percent.

Alternative 5: A lease notice would be applied to sensitive plant habitats (Appendix E). In addition, about five percent of the area would be NSO and the remainder would be standard terms.

Sensitive Plant Sites

Alternatives 3-4, 5: The 10 acres of known sites will be given avoidance under all alternatives. Alternatives 3 and 4 are NSO for other resources and alternative 5 can avoid under standard lease terms that allow movement fo the well site up to 200 meters. There would be no environmental effects to sensitive plant sites.

Riparian Areas

Alternatives 3-4, 5: All riparian areas would be protected by an NSO stipulation, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 3: Under this alternative, 100 percent of the Line Creek Elk winter/spring seasonal home range and 100 percent of the Line Creek Elk summer/fall seasonal home ranges within this management area would receive a NSO stipulation or in the case of the summer/fall range it would not be leased for soils. Selection of this alternative should result in minimal or reduced direct or indirect effects to wildlife resources which use this area.

Alternative 4: Under this alternative, approximately 95 percent of the Line Creek winter/spring home range would receive a NSO stipulation. The remaining five percent of this seasonal home range would receive a TL stipulation with occupation of this area precluded from November 30 to July 1 each year. Additionally, via this alternative, 95 percent of the Line Creek Elk summer/fall home range would receive a NSO stipulation. The remaining five percent of this seasonal home range would receive standard terms.

The Line Creek Elk herd typically uses this seasonal home range for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. It is anticipated that this level of resource protection would be sufficient to reduce or minimize direct and indirect effect to elk within this management area.

Alternative 5: Via this alternative, the winter/spring and summer/fall home ranges utilized by the Line Creek Elk herd would receive two types of resource considerations. Less than 5 percent of each of these seasonal home ranges
would receive a NSO stipulation. The remaining 95 percent of these seasonal home ranges would receive standard terms.

The Line Creek Elk herd typically uses both of these seasonal home ranges within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. It is anticipated that selection of this alternative would have adverse direct and indirect effects to the Line Creek Elk herd. At a minimum, displacement of elk from these seasonal home ranges to sub-optimum range would be anticipated.

Bighorn Sheep

Alternatives 3-4: Under these alternatives, 100 percent of the winter/spring home range used by the Rock Creek Bighorn Sheep herd would receive a NSO stipulation. Selection of these alternative would be anticipated to result in minimal or reduced direct or indirect effect to the bighorn sheep wildlife resources which use this area.

Alternative 5: Selection of this alternative would lease approximately 690 acres of winter/spring home range used by the Rock Creek Bighorn Sheep herd with standard terms.

The Rock Creek Bighorn Sheep typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. At a minimum, displacement of sheep from currently occupied seasonal home range to sub-optimum range would be anticipated.

Mountain Goats

Alternatives 3-4: Under these alternatives, 100 percent of the year long home range used by the Line Creek Mountain Goat herd would receive a NSO stipulation. Selection of these alternatives would be anticipated to result in minimal direct or indirect effect to the Line Creek herd of mountain goats.

Alternative 5: Selection of this alternative would lease approximately 520 acres of year long home range used by the Line Creek Mountain Goat herd with standard terms.

The Line Creek Mountain Goat herd typically uses the same areas during all portions of the year. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this seasonal home range. At a minimum, displacement of mountain goats from their currently occupied home range to sub-optimum range would be anticipated. This alternative affords mountain goats which inhabit this management area the least amount of resource protection of any of the action alternatives. Adverse effects to mountain goats within this management area would be anticipated if this alternative were selected.

Issue #3: Aesthetics (Map 2)

Alternatives 3-4: An NSO stipulation would be applied to about 85 percent of the management area to protect fragile soils, riparian areas, and the visually sensitive slopes over 40 percent. There would be little to no effect on the visual resource.

Alternative 5: Less than five percent of the slopes over 40 percent would be covered by an NSO stipulation for protection of riparian areas. The remainder would be leased using standard lease terms, making it available for occupancy by oil and gas activities. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Alternative 3: The existing recreational trails and their ¼ mile buffer would be covered by NSO stipulations for other resource protection, so there would be no environmental effects.

Alternative 4: About 99 percent of the existing trail system and its buffer would be covered by NSO stipulations for other resource protection. The remainder would have a TL stipulation, precluding occupancy from May 15 to September 15 annually. Oil and gas activities would not be evident to trail users during the highest recreational use period during the exploratory drilling period. Overall the effects would be very small.

Alternative 5: Less than two percent of the trail system would be covered by an NSO stipulation for riparian area protection. The rest would be leased with standard terms. Where occupancy occurs, trail users would possibly hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to trail users.

Issue #5: Cultural Resources

Alternatives 3 and 4: The two traditional cultural properties would be protected by an NSO stipulation for the site area and for 1/4 mile from the site boundary. The buffer may change upon further consultation with the Crow tribe. Under these alternatives there should be no direct effects.

Alternative 5: The two traditional cultural properties located in this management area would be protected by an NSO stipulation for the site areas and a CSU stipulation 1/4 mile from the site boundaries. The buffer may change upon further consultation with the Crow tribe. This alternative offers protection for the site area but does not guarantee protection of the site setting. There is an increased potential for adverse impacts to the sites under this alternative over the previous alternatives.

Issue #6: Roadless (Map 2)

Alternative 3: An NSO stipulation would be applied, so there would be no environmental effects.

Alternative 4: Approximately 95 percent of this roadless area is covered by NSO stipulations for other resource protection. The remaining five percent would be leased with TL and standard terms. If occupancy occurs, the roadless character of this portion would be affected. The area would experience added traffic noise and possible visual intrusions. If developed, added roads would allow hunting access.

Alternative 5: Less than five percent of the roadless area would be covered by an NSO stipulation for protection of riparian areas. The rest would be leased using standard terms. Where occupancy occurs, the roadless character would be affected. The area would experience added traffic noise and possible visual intrusions. If developed, added roads would allow hunting access.

Cumulative Effects

Issue #1: Soils and Vegetation - The Line Creek Plateau, a roadless alpine area in the southern part of the decision area, occupies a critical position between the Meeteetse Spires Area of Critical Concern (BLM) and the Absaroka-Beartooth Wilderness. Proposed developments on Line Creek Plateau has potential to effect the biological integrity of this network. Oil and gas activities may cumulatively add to the effects of other activities, such as big game hunting, mountain biking, snowmobiling, hiking, and horse riding and packing, on this alpine setting including impacts to sensitive plants, alpine vegetation, sedimentation into streams where trails intersect streams, and displacement of elk, bighorn sheep, and mountain goat populations from their critical ranges to less optimum habitat.

Possible Conflicts with Plans and Policies of Other Jurisdictions

The Meeteetse Spires Area of Critical Environmental Concern (ACEC) is located on the eastern slope of the Beartooth Mountains on BLM land about five miles south of Red Lodge. The BLM has identified a "No Lease" decision on this 960 acre area as their preferred alternative in the draft Oil and Gas RMP/EIS Amendment, because of this site's importance for scenic values as well as protection of rare plants.

4.2.4 E MANAGEMENT AREAS:

The following table 4.15 displays resource acreage information by alternative and stipulation for all E Management Areas. Individual Management Area information can be found in Chapter 3.2.4, Table 3.24.

Table 4.15

Resource Acres by Alternative and Stipulation (E Mgmt. Areas)
(Total Acres 26,560)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-21,910	NSO-21,910	NSO-21,910	NSO-21,910	NSO-21,910	CSU-260 ST-21,650
Sensitive Plant Habitat	NL-1,680	NSO-1,600 LN-80	NSO-1,520 TL-60 CSU-60 LN-40	NSO-1,470 TL-60 LN-150	NSO-1,470 TL-100 LN-110	NSO-10 CSU-90 LN-1,580
Riparian	NL-1,230	NSO-1,230	NSO-1,230	NSO-1,230	NSO-1,230	CSU-20 ST-1,210
Grizzly MS 2	NL-1,470	NSO-1,470	NSO-1,470	NSO-1,470	NSO-1,470	ST-1,470
Eagle	NL-1,480	NSO-1,480	NSO-320	NSO-270 TL-50	NSO-320	NSO-270
Elk Home Ranges Picket Pin & Meyers Cr Summer/Fall	NL-240	NSO-240	NSO-240	NSO-240	NSO-240	ST-240
Moose Home Ranges W. Stillwater Winter/Spring	NL-1,160	NSO-1,160	NSO-1,100 TL-60	NS0-1,100 ST-60	NSO-1,100 TL-60	ST-1,160
McDonald Basin Winter/Spring	NL-2,010	NSO-2,010	NSO-1,760 TL-250	NS0-1,760 TL-20 ST-230	NSO-1,760 TL-20 ST-230	ST-2,010
Bighorn Sheep Home Ranges Stillwater Winter/Spring	NL-1,800	NSO-1,800	NSO-1,540 TL-260	NSO-1,540 TL-260	NSO-1,540 TL-260	NSO-70 CSU-40 ST-1,690
Visuals	NL-14,080	NSO-14,080	NSO-14,080	NSO-14,080	NSO-14,080	CSU-180 ST-13,900
Trails	NL-1,870	NSO-1,860 CSU-10	NSO-1,820 TL-10 CSU-30 ST-10	NSO-1,820 TL-10 ST-40	NSO-1,820 TL-10 ST-40	ST-1,870

	1	2	3	4	4A	5
Recreation River Stillwater	NL-890	NSO-890	NSO-630 CSU-110 TL-150	NSO-520 TL-240 ST-130	NSO-520 TL-240 ST-130	NSO-90 CSU-100 ST-700
Roadless	NL-5,810	NSO-5,810	NSO-5,080 TL-10 CSU-10 ST-710	NSO-5,080 ST-730	NSO-5,080 ST-730	ST-5,810

4.2.4.1 MA E: STILLWATER

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: An NSO stipulation would be applied to all fragile soils, so there would be no environmental effects.

Alternative 5: An CSU stipulation would be applied to two percent of the fragile soils for other resource protection. Standard terms would be applied to the remaining 98 percent. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2: An NSO stipulation would be applied to 95 percent of the the sensitive plant habitat. A lease notice would be applied to the remaining five percent.

Alternative 3: An NSO stipulation would be applied to 90 percent of the sensitive plant habitat. The remaining ten percent would be covered with a lease notice.

Alternative 4-4A: An NSO stipulation would be applied to 85 percent of the sensitive plant habitat. A lease notice would be applied to the remaining 15 percent.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Riparian Areas

Alternatives 2-4A: An NSO stipulation would be applied to all riparian areas, so there are no environmental effects.

Alternative 5: An CSU stipulation would be applied to two percent of the riparian areas for other resource protection. Standard terms would be applied to the remaining 98 percent. The 200 meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated by standard terms, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause gullying. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Grizzly Bears

Alternative 2-4A: NSO stipulations would be applied to 100% of the MS2 Grizzly Bear habitat within this management area Selection of this alternative would prevent or minimize any adverse direct or indirect effects to grizzly bears, or their habitats within this management area.

Alternative 5: Under this alternative, 100% of MS2 habitat within this management area, would receive standard terms. Under the provisions of standard term leasing, all Threatened and Endangered Species are afford what ever level of resource protection is necessary in order to not adversely impact the species. This may include prevention of surface occupation even though the lease was sold without an NSO stipulation. However, a site specific survey to determine grizzly bear use trends would be required in order to assess what the necessary level of mitigation would be when a APD/NOI is filed with the Forest Service and Bureau of Land Management. It is anticipated that this level of resource protection is sufficient to reduce or minimize direct or indirect effects to grizzly bears and their MS2 habitats which exist in the management area.

Eagles

Alternative 2: An NSO stipulation would cover the area within a 1.0 mile radius (1,480 acres) surrounding the known golden eagle nest site contained within this management area. Selection of this alternative should result in minimal direct or indirect effect to golden eagles or their habitats which occur in this management area.

Alternative 3: Via this alternative, the area within a 0.5 mile radius, approximately 320 acres of federal land, surrounding the known golden eagle nest would receive a NSO stipulation. However, direct and indirect effects to the golden eagle may still occur.

Alternative 4: Under this alternative, the area within a 0.25 mile radius, approximately 270 acres of federal land, surrounding the known golden eagle nest would receive a NSO stipulation. Additionally, the area within a .5 mile radius of the eagle nest would receive a TL stipulation. This would result in approximately 50 acres of TL stipulation. Under the terms of the lease, ground disturbances would not be allowed from February 15 to July 20 each year.

It is anticipated that this level of resource consideration may or may not be sufficient to insure continued use of the known golden eagle nest in this management area. The site specific topographic characteristics of a well location in relationship to the eagle nest could prevent adverse impacts.

Alternative 4A: An NSO stipulation has been placed on a 0.50 mile radius, approximately 320 acres of National Forest lands, surrounding the known golden eagle nest.

Alternative 5: Selection of this alternative would lease the area within .25 miles of the known golden eagle nest with a NSO stipulation. Oil and gas activities would not be removed from the eagles line of sight. It is anticipated that adverse direct and indirect effects to the golden eagle which uses this management area would occur.

Elk

Alternative 2-4A: Under these alternative, 100% of the winter/spring home range which is jointly used by the Picket Pin and Meyers Creek Elk herd, would receive a NSO stipulation. Selection of this alternative would be expected to prevent or minimize adverse direct or indirect effects to the elk which use this management area.

Alternative 5: Via this alternative, 100% of the summer/fall home range used jointly by the Picket Pin and Meyers Creek Elk herds would experience standard terms.

These herds typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of elk from these seasonal home ranges to sub-optimum range would be anticipated.

Moose

Alternative 2: Via this alternative, 100% of winter/spring home range used by the West Fork of the Stillwater Moose herd and 100% of the McDonald Basin Moose herd's year long home range with a NSO stipulations. It is believed that this level of resource consideration would minimize or reduce direct or indirect effect to the moose wildlife resources which use this area.

Alternative 3: Under this alternative, occupied moose home ranges within this management area would receive two types of stipulations. Approximately 95% of winter/spring home range used by the West Fork of the Stillwater River Moose herd would receive a NSO stipulation. The remaining 5% of this seasonal home range would have a TL stipulation placed on it. Under the terms of this lease, these 60 acres would be precluded from surface occupation from October 15 to June 15 each year.

Additionally, the year long home range utilized by the McDonald Basin Moose herd would receive two types of stipulations. Approximately 80% of this occupied home range would experience NSO leasing. The remaining 20% of this occupied home range would receive a TL stipulation. Under the terms of the lease, this area would be preclude from surface occupation from October 15 to June 15 each year in areas which serve as winter/spring home range (low elevation), and from June 16 to October 14 in areas which serve primarily as summer/fall home range (high elevation adjacent to wilderness). It is anticipated that this level of resource protection would be sufficient to reduce or minimize direct or indirect effects to this wildlife resource.

Alternative 4: Under this alternative, the occupied moose home range within this management area would receive two types of resource considerations.

Approximately 95% of winter/spring home range used by the West Stillwater Moose herd would receive a NSO stipulation. The remaining 5% of this seasonal home range utilized by this herd would receive standard terms.

The West Stillwater Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within the moose seasonal home range. Selection of this alternative would have adverse direct and indirect effects to the moose which use this management area. At a minimum, displacement of moose from this seasonal home range to sub-optimum range would be anticipated.

In addition, year long home range, used by the McDonald Basin Moose herd, which occurs in this management area, would experience both NSO and standard term stipulations. Approximately 80% of this year long home range would be NSO stipulated. The remaining 20% would receive standard terms. Direct and indirect effects to this herd would be similar as previous described for the West Stillwater Moose herd within this management area.

Alternative 4A: Selection of this alternative would result in leasing the summer/fall home range used by the McDonald Basin Moose herd with 3 levels of resource considerations. Approximately 90% of this seasonal home range would be leased with a NSO stipulation. Additionally, less then 1% of the area would be leased with a TL stipulation due to overlap with the other surface resources. Finally, approximately 4% of this summer/fall home range would be leased with standard terms. It is anticipated that this level of resource consideration is sufficient to reduce or minimize adverse direct and indirect effects to the McDonald Basin Moose herd during the time which they occuppy this management area.

The winter/spring home range used by the West Fork Stillwater Moose herd would be leased with two types of stipulations. Approximately 95% of this seasonal home range would receive a NSO stipulation. The remaining 5% of this seasonal home range would be leased with a TL stipulation. Under the terms of the lease, oil and gas activities would be precluded from October 15 to June 15 each year. It is anticipated that this level of resource consideration would be sufficient to prevent or minimize adverse direct or indirect effect to the the West Fork Stillwater Moose herd during the time which they occupy this management area.

Alternative 5: Under this alternative, 100% of the winter/spring home range utilized by the West Stillwater Moose herd and 100% of the year long home range used by the McDonald Basin Moose herd would receive standard terms.

These herds typically use seasonal home ranges within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home range. At a minimum, displacement of moose from this seasonal home range to sub-optimum range would be anticipated.

Bighorn Sheep

Alternative 2: Via this alternative, 100% of the Stillwater Bighorn Sheep winter/spring range would receive a NSO stipulation. Direct or indirect effects to the Stillwater Bighorn Sheep herd are anticipated to be minimal.

Alternative 3-4: Under these alternatives, the Stillwater Bighorn Sheep home range would be leased with two types of stipulations. Approximately 85% of this winter/spring home range would receive a NSO stipulation. The remaining 15% of Stillwater Bighorn Sheep habitat would have a TL stipulation applied. Under the terms of the lease, this area would be precluded from surface occupation from November 1 to June 1 each year. It is anticipated that this level of resource protection would be sufficient to prevent or minimize direct or indirect effects to the Stillwater Bighorn Sheep herd which inhabits this management area.

Alternative 5: Via this alternative, the winter/spring home range used by the Stillwater Bighorn Sheep herd would receive three levels of resource considerations. Approximately 5% of this seasonal home range would receive a NSO stipulation. Approximately 5% of this seasonal home range would receive a CSU stipulation. Under the conditions of the lease, operators would be required to visually and audibly screen the impacts of well development to the extent possible. Finally, the remaining 90% of this seasonal home range would receive standard terms.

The Stillwater Bighorn Sheep herd typically uses this winter/spring home range for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within bighorn seasonal home ranges. At a minimum, displacement of the Stillwater Bighorn Sheep herd from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: Approximately 95 percent of the management area would be leased with NSO stipulations for various resources, including all slopes over 40 percent. Therefore, there would no effect on the visual resource.

Alternative 3-4A: Approximately 90 percent of the management area would be leased with NSO stipulations for various resources, including all slopes over 40 percent. Therefore, there would no effect on the visual resource.

Alternative 5: About five percent of the slopes over 40 percent would be covered by NSO stipulations for other resource protection, primarily for riparian areas. The remainder would be leased with standard terms. Where occupancy by oil and gas activities occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Trails

Alternative 2: Over 99 percent of the existing recreational trail system and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. The remainder would be leased with a CSU stipulation that would minimize the sights and sounds of oil and gas activities that may be perceived from the trail system. There would be little to no effects on the trail users.

Alternative 3: About 95 percent of the existing recreational trail system and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. An timing stipulation for West Stillwater Moose winter range would cover approximately one percent of the trail buffer, however the timing, October 15 Though June 15, will not greatly effect this area, due to winter weather conditions and snowpack. The remainder would be leased with a CSU stipulation that would minimize the sights and sounds of oil and gas activities that may be perceived from the trail system. There would be little to no effects on the trail users.

Alternative 4-4A: About 90 percent of the existing recreational trail system and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. An timing stipulation for West Stillwater Moose winter range would cover approximately one percent of the trail buffer, however the timing which is October 15 through June 15, will not greatly effect this area, due to winter weather conditions and snowpack. The remainder would be leased with standard terms. Some sights and sounds of oil and gas activities may be perceived from the trail system, but the effects on the trail users would be minimal.

Alternative 5: All of the existing recreational trail system and its ¼ mile buffer would be leased with standard terms. Where occupancy occurs, trail users could possibly hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to trail users.

Recreation River

Alternative 2: Under this alternative 100% of the Stillwater Recreation River and its ¼ mile buffer would be covered by an NSO stipulations for other resource protection. There would be no effects on recreationists along the river.

Alternative 3: Under this alternative 70 percent of the Stillwater Recreation River and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. An timing stipulation from Stillwater Big Horn Sheep winter range would cover approximately 15 percent of the Recreation River buffer. The remaining 15 percent would be leased with a CSU stipulation that would minimize the sights and sounds of oil and gas activities that may be perceived from the river. This would minimize the effects of oil and gas activities on recreationists along the river. There may be a sight increase in road access along the river.

Alternative 4-4A: About 60 percent of the Stillwater Recreation River and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. About ten percent, that portion around the eagle nest, would be covered by a TL stipulation from February 15 to July 20 each year. This would preclude occupancy for portion of the high use period on the river. An timing stipulation which precludes surface occupation from November 1 to June 1 annually for Stillwater Big Horn Sheep winter range would cover approximately 15 percent of the recreation river buffer. The remaining 15 percent would be leased with standard terms. Where occupancy occurs, river users would hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to river users. There may be an increase in road access along the river.

Alternative 5: About ten percent of the Stillwater Recreation River and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. An CSU stipulation would cover ten percent of the recreation buffer. The remaining 80 percent would be leased with standard terms. Where occupancy occurs, river users would hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance to river users. There may be an increase in road access along the river.

Issue #5: Cultural Resources

Alternatives 2-4A: The two traditional cultural properties that are located in this management area would be protected by an NSO stipulation for the site and for ¼ mile from the site boundary. These buffers may change upon consultation with the Crow tribe. The Mouat Mine is also located in the area and would be protected with the same stipulation. There would be no direct impact to these sites.

Alternative 5: The two traditional cultural properties that are located in this management area would be protected by an NSO stipulation for the site and a CSU stipulation for ¼ mile from the site boundary. These buffers may change upon consultation with the Crow tribe. The Mouat Mine is also located in the area and would be protected with the same stipulations. There would be an increased possibility for impact to these sites over the other alternatives.

Issue #6: Roadless (Map 2)

Alternative 2: An NSO stipulation would be applied to the roadless area, so there would be no environmental effects.

Alternative 3: An NSO stipulation would be applied to 85 percent of the roadless area for other resource protection. An timing stipulation which precludes surface occupation from November 1 to June 1 annually for Stillwater Big Horn Sheep winter range would cover one percent of the roadless area. An CSU stipulation would cover one percent of the area while the remaining 13 percent would be leased with standard terms. Where occupancy could not be avoided on this portion through use of the 200 meter offset, the roadless character would be affected.

Alternative 4-4A: An NSO stipulation would be applied to 85 percent of the roadless area for other resource protection. The remaining 15 percent would be leased with standard terms. Where occupancy could not be avoided on this portion through use of the 200 meter offset, the roadless character would be affected.

Alternative 5: The entire roadless area would be leased with Standard Terms and would be available for occupancy by oil and gas activities. Where occupancy could not be avoided on this portion through use of the 200 meter offset, the roadless character would be affected. Indirect effects would include the possibility of the recreation visitors viewing oil and gas activities from the higher elevations within the adjacent wilderness area.

4.2.5 F MANAGEMENT AREAS:

The following table 4.16 displays resource acreage information by alternative and stipulation for all F Management Areas. Individual management area information can be found in Chapter 3.2.5, Table 3.25.

Table 4.16

Resource Acres by Alternative and Stipulation (F Mgmt. Areas)
(Total Acres 9,500)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-3,370	NL-510 NSO-2,860	NSO-3,370	NSO-110 TL-280 ST-2,980	NA-3,370	NSO-110 ST-3,260
Sensitive Plant Habitat	NL-1,720	NSO-1,720	NSO-620 TL-1,100	NSO-220 TL-90 LN-1,410	NA-1,720	NSO-210 LN-1,510
Riparian	NL-580	NL-340 NSO-240	NSO-580	NSO-580	NA-580	NSO-580
Yellowstone Cutthroat Trout						
Presumed	NL-570	NL-550 NSO-20	NSO-290 LN-280	NSO-270 TL-10 LN-290	NA-570	NSO-270 LN-300
Moose Home Ranges						
McDonald Basin Summer/Fall	NL-430	NSO-430	NSO-350 TL-80	NSO-70 TL-160 ST-200	NA-430	NSO-70 ST-360
E. Rosebud Winter/Spring	NL-500	NSO-500	NSO-350 TL-150	NSO-140 TL-150 ST-210	NA-500	NSO-140 ST-360
Bighorn Sheep Home Ranges						
Stillwater Winter/Spring	NL-110	NSO-110	NSO-110	NSO-10 TL-100	NA-110	NSO-10 ST-100
Developed Campground	NL-310	NL-170 NSO-140	NSO-310	NSO-310	NA-310	NSO-310
Trails	NL-1,740	NL-1,250 NSO-490	NSO-610 TL-1,130	NSO-350 TL-260 ST-1,130	NA-1,740	NSO-350 ST-1,390
Roadless	NL-1,110	NSO-1,110	NSO-1,110	NSO-30 ST-1,080	NA-1,110	NSO-30 ST-1,080

	1	2	3	4	4A	5
Red Lodge Ski Area	NL-220	NSO-220	NSO-220	NSO-10 ST-210	NA-220	NSO-10 ST-210
Recreation River						
E. Rosebud	NL-1,530	NSO-1,530	NSO-320 TL-1,210	NSO-250 TL-420 ST-860	NA-1,530	NSO-250 ST-1,280
W. Fork Rock Creek	NL-80	NSO-80	NSO-40 TL-40	NSO-20 TL-60	NA-80	NSO-20 ST-60
Rock Creek	NL-2,100	NL-2,100	NSO-900 TL-1,200	NSO-440 TL-530 ST-1,130	NA-2,100	NSO-440 ST-1,660

4.2.5.1 MA F: WOODBINE

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-3: An NSO stipulation would be applied to all fragile soils, so there would be no environmental effects.

Alternatives 4, 5: Less than ten percent of the fragile soils would be covered by NSO stipulations for riparian area and campground protection. The remainder would be leased with standard terms. The effects that would not be mitigated include poor to unsuccessful reclamation and increased water erosion.

Alternative 4A: Selection of this alternative would render the entire management area administratively unavailable so there would be no environmental effects.

Sensitive Plants

Alternative 2-3: An NSO stipulation would be applied to all sensitive plant habitats, so there would be no environmental effects.

Alternative 4, 5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Alternative 4A: Selection of this alternative would render the entire management area administratively unavailable so there would be no environmental effects.

Riparian Areas

Alternatives 2-5: An NSO stipulation would be applied to riparian areas, so there would be no environmental effects.

Alternative 4A: Selection of this alternative would render the entire management area administratively unavailable so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Fisheries

Alternatives 2-3: This area contains a population of Cutthroat Trout, believed to be the genetically pure Yellowstone sub-species. Under these alternatives, an NSO stipulation would cover either riparian and/or Yellowstone cutthroat trout, so there would be no environmental effects.

Alternative 4: Under this alternative 50 percent of the presumed Yellowstone Cutthroat Trout habitat would receive an NSO stipulation. The remaining 50 percent would be covered by a TL stipulation which would preclude any surface occupancy from May 15 to September 15 annually. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Alternative 4A: Selection of this alternative would render the entire management area administratively unavailable so there would be no environmental effects.

Alternative 5: Under this alternative 50 percent of the presumed Yellowstone cutthroat trout habitat would receive an NSO stipulation. The remaining 50 percent would receive standard terms. A drill program may be delayed or deactivated for up to a 60 day period and specific well sites may be relocated up to 200 meters. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Bighorn Sheep

Alternative 2-3: Under this alternative, 100 percent of the Stillwater Bighorn Sheep winter/spring home range, contained within this management area, would receive a NSO stipulation. This level of resource consideration would be sufficient to reduce or minimize direct or indirect effects to the Stillwater Bighorn Sheep herd.

Alternative 4: Under this alternative, the Stillwater Sheep winter/spring home range would receive two levels of resource considerations. Approximately, 10 percent of this seasonal home range would receive a NSO stipulation. The remaining 90 percent of this seasonal home range would receive TL stipulation. Under the terms of the lease, occupation of this area would not be permitted from November 1 to June 1 annually. It is anticipated that this level of resource protection is sufficient to reduce or minimize impacts to bighorn sheep within this management area.

Alternative 4A: Selection of this alternative would render this management area administratively unavailable. It is anticipated that selection of this alternative would result in minimal direct and indirect effects to the Stillwater Bighorn Sheep herd's use of this management area.

Alternative 5: Under this alternative, the Stillwater Sheep winter/spring home range would receive two levels of resource considerations. Approximately, 10 percent of this seasonal home range would receive a NSO stipulation. The remaining 90 percent of this seasonal home range would receive standard terms.

The Stillwater Bighorn Sheep herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this seasonal home range. Selection of this alternative would have adverse direct and indirect effects to the Stillwater Bighorn Sheep herd which seasonally uses this management area. At a minimum, displacement of bighorn sheep from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #4: Recreation (Map 6)

Developed Campgrounds

Alternative 2-3: Under these alternatives the entire management area would be covered by an NSO stipulation for protection of fragile soils, so there would be no effects on the developed campground.

Alternative 4: The developed recreation site would be leased with an NSO stipulation. A ¼ mile buffer around this developed site would be leased with a TL stipulation, precluding oil and gas activities from May 15 to September 15, the peak season of use. There would also be a CSU stipulation on this buffer area, where the operator must meet screen their activities from the campground. There would be little to no effects on campground users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effects to the campground users.

Alternative 5: The developed recreation site would be protected by a NSO stipulation. The remaining area would be leased with standard terms. Under standard terms leasing two levels of resource protection may be provided. A drill program may be delayed or deactivated for up to a 60 day period and a specific well site may be relocated up to 200 meters. Where occupancy occurs, recreationists may be able to hear and see oil and gas activities. Views could be altered for the duration of these activities.

Trails

Alternatives 2-3: The entire management area would be covered by an NSO stipulation of the protection of fragile soils, so there would be no effects to trail users.

Alternatives 4-5: The trail system and its ¼ mile buffer would be leased with standard terms. Where occupancy occurs, trail users would possibly hear and see oil and gas development activities. Views could be altered for the duration of these activities. Use of the 200 meter offset and the 60 day delay would lessen disturbance to trail users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effects to the trail user.

4.2.5.2 MA F : WEST ROSEBUD

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-3: An NSO stipulation would be applied to all fragile soils, so there would be no environmental effects.

Alternatives 4-5: About 20 percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remaining 90 percent would be leased with Standard Terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation, wind and water erosion, and mass failure would be higher until reclamation is successful.

Alternatives 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Riparian Areas

Alternatives 2-5: An NSO stipulation would be applied to all riparian areas, so there would be no environmental effects.

Alternatives 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Sensitive Plant Habitat

Alternative 2: An NSO stipulation would cover 100 percent of the sensitive plant habitat, so there would be no environmental effects.

Alternative 3: An NSO stipulation would cover 10 percent of the sensitive plant habitat. The remaining 90 percent would be covered by an lease notice (Appendix E).

Alternative 4: An NSO stipulation would cover five percent of the sensitive plant habitat. The remaining 95 percent of sensitive plant habitat would be covered by an lease notice (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Moose

Alternative 2: Selection of this alternative would lease 100 percent of the McDonald Basin Moose year long home range with a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize direct or indirect effects to the McDonald Basin Moose herd which uses this management area.

Alternative 3: Under this alternative, the year long McDonald Basin Moose home range would receive two types of stipulations. Approximately 80 percent of this home range would receive a NSO stipulation. The remaining 20 percent of this home range would receive a TL stipulation. Under the terms of the lease, areas which provide winter/spring habitat (low elevation areas) within this home range would be preclude from surface occupation from October 15 to June 15 each year. Areas which serve primarily as summer/fall habitat (high elevation areas) would not experience occupation by oil and gas activities from June 16 to October 14 each year. It is anticipated that this level of resource protection would be sufficient to minimize direct or indirect effects to the McDonald Basin Moose home range within this management area.

Alternative 4: Approximately 20 percent of this home range would receive a NSO stipulation. An TL stipulation for developed campgrounds which precludes any surface occupation from May 15 to September 15 annually would cover 40 percent of the yearlong moose range. This TL stipulation would afford partial mitigation during moose occupation during the spring portions of the year. Displacement would still occur during the winter months. The remaining 40 percent of this home range would receive standard terms.

The McDonald Basin Moose herd typically uses this year long home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. Selection of this alternative would be expected to have adverse direct and indirect effects to the moose which use the management area. At a minimum, displacement of moose from these seasonal home ranges to sub-optimum range would be anticipated.

Alternative 4A: Selection of this alternative would render this management area administratively unavailable. Selection of this alternation would be anticipated to prevent or minimize direct and indirect effects to wildlife resources in this management area.

Alternative 5: Via this alternative, the McDonald Basin Moose year long home range would receive two levels of resource considerations. Approximately 20 percent of this home range would receive a NSO stipulation. The remaining 80 percent of this home range would receive standard terms.

The McDonald Basin Moose herd typically uses the year long home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges.

Selection of this alternative would be expected to have adverse direct and indirect effects to moose which use this management area. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2-3: Approximately 50 percent of the management area would be covered by NSO stipulations for protection of various resources. There would be CSU stipulations for a ¼ mile surrounding the campgrounds and a ¼ mile visual corridor buffer surrounding the entire management area where the operator would be required to screen the visual and audible impacts of activities in order to meet Retention or Partial Retention visual quality objective. The area would retain its natural appearance.

Alternative 4: Approximately ten percent of the management area would be covered by NSO stipulations for protection of riparian areas and campgrounds. There would be CSU stipulations for a ¼ mile surrounding the campgrounds and a ¼ mile visual corridor buffer surrounding the entire management area where the operator would be required to screen the visual and audible impacts of activities in order to meet Retention or Partial Retention visual quality objective. While there may be some modification of the landscape, the area would generally retain its natural appearance.

Alternative 4A: The entire management area would be administratively unavailable. There would also be an CSU stipulation for a ¼ mile visual corridor buffer surrounding the entire management area, where the operator would be required to screen the visual and audible impacts of activities in order to meet Retention or Partial Retention visual quality objective. The area would maintain its natural appearance.

Alternative 5: Approximately ten percent of the management area would be covered by NSO stipulations for protection of riparian areas and campgrounds. The rest of the area would be leased with Standard Terms. Where oil and gas occupancy occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Developed Campgrounds

ALternative 2-4: The campgrounds would be protected with an NSO stipulation. The surrounding ¼ mile buffer would be leased with a TL stipulation, precluding oil and gas occupancy from May 15 to September 15 each year, and a CSU stipulation, where the operator would visually and audibly screen activities from the campground. There would be no impacts on campground users.

Alternative 4A: The entire management area would be administratively unavailable. There would be no impacts to the campground users.

Alternative 5: The campground site itself would be protected by an NSO stipulation. The area surrounding the campground would be leased with Standard terms. If occupancy occurs, recreationists may hear and see oil and gas development activities from the campgrounds. Use of the 200 meter offset and the 60 day delay would lessen possible impacts.

Trails

Alternative 2: The trail and its ¼ mile buffer would be protected by an NSO stipulation. The trail users would experience no change to this area.

Alternative 3: The trail and its ¼ mile buffer would be protected by a TL stipulation, precluding development from May 15 to September 15 annually. Where occupancy occurs, oil and gas activities may be evident to trail users outside of this period.

Alternative 4-5: The trail would be leased with Standard Terms. Where occupancy occurs, trail users may hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible impacts.

Alternative 4A: The entire management area would be administratively unavailable. The trail users would experience no change to this area.

Issue #6: Roadless (Map 2)

Alternative 2-3: The Fishtail Saddleback Roadless area would be protected by an NSO stipulation. Recreation users would experience no change in the roadless character of the area.

Alternative 4-5: Ten percent of the Fishtail Saddleback Roadless Area would be covered by an NSO stipulation for riparian area protection. The remaining 90 percent would be leased with Standard Terms. Where oil and gas occupancy occurs, the roadless character of the area could be affected due to increase traffic from oil and gas activities and possible increase of use during hunting seasons.

Alternative 4A: The entire management area would be administratively unavailable. Recreation users would experience no change in the roadless character of the area.

Relationship Between Short-Term Use and Long-Term Productivity

About 25 percent of this management unit consists of alpine fragile soils (glacial cirque headwalls). The long-term effects of various alpine reclamation methods is not yet known. Little study has been devoted to problems of long-term interactions of soil processes. Successional processes and their relationships to disturbance are also little understood. Not much is known about the physiological and ecological characteristics of most native alpine species (Soils Technical Report and Biological Evaluation, Project File).

Irreversible and Irretrievable Commitment of Resources

Some alpine vegetative communities recover from disturbance without too much difficulty, but the majority do not. Some alpine soils are relatively resistant to disturbance; other erode rapidly. Once the soil is gone in a cold climate, the time required to replace is unknown (Biological Evaluation, Project File).

4.2.5.3 MA F : EAST ROSEBUD

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-3: Fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Alternatives 4-5: Five percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remaining 95 percent would be protected by standard lease terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Riparian Areas

Alternatives 2-5: Riparian areas would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to riparian area.

Sensitive Plant Habitat

Alternative 2: An NSO stipulation would be applied to 100 percent of the sensitive plant habitat, so there would be no environmental effects.

Alternative 3-5: An NSO stipulation would cover 20 percent of the sensitive plant habitat. A lease notice would be applied to the remaining 80 percent of the sensitive plant habitat (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to sensitive plant habitats.

Sensitive Plant Sites

Alternative 2-3: Known sensitive plant sites would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 4-5: Sensitive plant sites would be protected with standard lease terms (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to sensitive plant habitats.

Issue #2: Fish and Wildlife (Map 3, 4, 5 and 7)

Moose

Alternative 2: Under this alternative, 100 percent of the winter/spring home range utilized by the East Rosebud Moose herd would receive a NSO stipulation. It is anticipated that selection of this alternative would result in minimal direct and indirect effects to moose which utilize this management area.

Alternative 3: Under this alternative, the East Rosebud Moose winter/spring home range within this management area, would receive two types of stipulations. Approximately 70 percent of this seasonal home range would receive a NSO stipulation. The remaining 30% of this seasonal home range, would receive a TL stipulation. Under the terms of this lease, areas which have a TL stipulation placed on them would be precluded from surface occupation from October 15 to June 15 each year. It is anticipated that this level of resource protection is sufficient to reduce or minimize direct or indirect effects to moose which utilize this management area.

Alternative 4: Under this alternative, the winter/spring home range used by the East Rosebud Moose herd would receive three levels of resource considerations. Approximately 30 percent of this seasonal home range would receive a NSO stipulation. An additional 35 percent of this seasonal home range would receive a TL stipulation. However, the TL stipulation is due to overlap with the recreational resource. The recreational TL stipulation applies during the peak visitor use period during the summer months, and as such, will provide little if any protection during the winter/spring moose habitat utilization time period. The remaining 35 percent of the East Rosebud Moose winter/spring home range, within this management area, would receive standard terms.

The East Rosebud Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. Selection of this alternative would be expected to have adverse direct and indirect effects to moose which use this management area. At a minimum, displacement of moose from this seasonal home range to sub-optimum range would be anticipated.

Alternative 4A: Selection of this alternative would render this management area administratively unavailable, and it is anticipated that minimum direct and indirect effects to wildlife resources would occur in this management area.

Alternative 5: Via this alternative, the winter/spring home range used by the East Rosebud Moose herd would receive two levels of resource considerations. Approximately 30 percent of this seasonal home range would be receive a NSO stipulation. The remaining 70 percent would receive standard terms.

The East Rosebud Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. Selection of this alternative would be anticipated to have adverse direct and indirect effects to the moose which inhabit this management area on a seasonal basis. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: More than 95 percent of this management area would be leased with NSO stipulations for protection of various resources. In addition, a ¼ mile visual corridor buffer around this management area would be leased with a CSU stipulation, where the operator would visually and audibly screen oil and gas activities. There would be little to no affect on the views.

Alternatives 3-4: A ¼ mile buffer around developed campgrounds as well as a ¼ mile visual corridor buffer surrounding the entire management area would be leased with a CSU stipulation, where oil and gas activities would be visually and audibly screen from view. An additional 15-30 percent of the management area would be covered by NSO stipulations for protection of various resources. Some oil and gas activities may be perceived by visitors to the area, but the visual impact would be minor.

Alternative 4A: The entire management area would be administratively unavailable. A ¼ mile visual corridor buffer surrounding this management area boundary would also be leased with a CSU stipulation to provide a visual and audible screen from oil and gas activities. There would be little to no affect on the views.

Alternative 5: Approximately 15 percent of the management area would be covered by an NSO stipulation for riparian area and campground protection. The remaining 70 percent would be leased with Standard Terms and be available for occupancy by oil and gas activities. Where that occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Developed Campgrounds

Alternative 2: Under this alternative 100 percent of the developed campgrounds and the ¼ mile buffer around these campgrounds would be leased with an NSO stipulation. There would be no effect on campground users.

Alternative 3: An NSO stipulation would cover 100 percent of the developed campground site. The ¼ mile buffer surrounding these sites would be covered by 10 percent NSO stipulation. The remaining 90 percent of this buffer would be leased with a TL stipulation, which precludes development from May 15 to September 15 annually. There would be little to no effect to the campground users during the peak visitor season.

Alternative 4: An NSO stipulation would cover 100 percent of the developed campground site. The ¼ mile buffer surrounding these sites would be covered by seven percent NSO stipulation. The remaining 83 percent of this buffer would be leased with a TL stipulation, which precludes development from May 15 to September 15 annually. There would be little to no effect to the campground users during the peak visitor season.

Alternative 4A: The entire management area would be administratively unavailable. There would be no effects to the campground users.

Alternative 5: The developed recreation site would be covered by an NSO stipulation. The area outside of the developed site would be leased by Standard Terms, and could be occupied by oil and gas activities. Where that occurs, views would appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Trails

Alternative 2: The trail system and its ¼ mile buffer would be leased with an NSO stipulation, so there would be no effects to trail users.

Alternative 3: About 25 percent of the trail system and its ¼ mile buffer would be protected by an NSO stipulation for riparian area protection. The remaining 75 percent would be protected by a TL, precluding development from May 15 to September 15 annually. Trail users may perceive some oil and gas activities outside of this period.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effects to trail users.

Alternative 4-5: About 25 percent of the trail system and its ¼ mile buffer would be protected by an NSO stipulation for riparian area protection. The remaining 75 percent would be leased with Standard Terms. Where occupancy occurs, trail users would hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen some of the disturbance to trail users.

Recreation River

Alternative 2: The East Rosebud Recreation River and a ¼ mile buffer surrounding it would be protected by an NSO stipulation. Recreation users would see no change to the existing appearance of the area.

Alternative 3: About 20 percent of the East Rosebud Recreation River and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. The remaining 80 percent would be protected by a TL stipulation, precluding development from May 15 to September 15 annually. Recreationists may experience oil and gas related ground disturbances outside of this period.

Alternative 4-5: About 15 percent of the East Rosebud Recreation River and its ¼ mile buffer would be covered by NSO stipulations for riparian area and campground protection. The remaining 85 percent would be leased with Standard Terms. Where occupancy occurs, oil and gas activities would be visible, and the landscape would appear modified for the duration of the activities. Following reclamation, the area would return to a more natural appearance. Use of the 200 meter offset and the 60 day day would lessen some of these impacts.

Alternative 4A: The entire management area would be administratively unavailable, so recreation users would see no change to the existing appearance of the area.

4.2.5.4 MA F : GRIZZLY PEAK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-3: Fragile soils would be protected by an NSO stipulation, so there would be no environmental effects.

Alternatives 4-5: Five percent of the fragile soils would be protected by an NSO stipulation for riparian area protection. The remaining 95 percent would be leased with Standard Terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water and wind erosion would be higher until reclamation is successful.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to fragile soils.

Sensitive Plant Habitat

Alternatives 2-3: An NSO stipulation from high hazard and fragile soils would cover 100 percent of the sensitive plant habitat. There would be no environmental effects.

Alternatives 4-5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to sensitive plant habitats.

Riparian Areas

Alternatives 2-5: Riparian areas would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to riparian areas.

Issue #3: Aesthetics (Map 2)

Alternative 2: The entire management area would be leased with an NSO stipulation, so there would be no effect on the visual appearance of the area.

Alternative 3: Approximately 85 percent of the management area would be covered by NSO stipulations for protection of various resources. The remaining 15 percent would be protected by a TL stipulation, precluding oil and gas activities from November 5 to April 15 annually. Where that occurs, views from off-site may appear modified for the duration of activities. However, because of the small amount of area involved, the impact to the forest visitor would be minor. Following reclamation, the views would again be predominantly natural appearing.

Alternatives 4-5: Approximately two percent of the management area would be protected by an NSO stipulation for riparian area protection. The remaining 98 percent would be leased with Standard Terms. Where occupancy occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on the visual appearance of the area.

Issue #4: Recreation (Map 6)

Trails

Alternative 2: The trail system and its ¼ mile buffer would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 3: About 80 percent of the trail system and its ¼ mile buffer would be covered by an NSO stipulation for protection of fragile soils. The remaining 20 percent would be protected by a TL stipulation, precluding oil and gas activities from May 15 to September 15 annually, the peak visitation period. Trail users may experience some oil and gas activities outside of this period, but the impact would be minor.

Alternatives 4-5: The trail system and its buffer would be protected by standard lease terms. Where occupancy occurs, trail users would hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen some of the disturbance to trail users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Red Lodge Mountain Ski Area

Alternatives 2-3: The Red Lodge Ski Area would be protected by an NSO stipulation, so skiers would not see any change from the current conditions on the ski area site.

Alternatives 4-5: Approximately five percent of the Red Lodge Ski Area would be protected by an NSO stipulation for riparian area protection. The remaining 95 percent would be leased with Standard Terms. If occupancy occurs, skiers would hear and see oil and gas development activities. Roads may be constructed into the area to access drill sites. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Issue #6: Roadless (Map 2)

Alternatives 2-3: The Burnt Mountain Roadless Area would be protected by an NSO stipulation so there would be no environmental effects.

Alternatives 4-5: The Burnt Mountain Roadless Area would be protected by standard lease terms. Where occupancy by oil and gas activities occurs, the roadless character of the area would be affected due to increased traffic from oil and gas activities and an increase could also occur during hunting seasons.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

4.2.5.5 MA F : CASCADE

Issue #1: Soils and Vegetation (Map 1)

Sensitive Plant Habitat

Alternative 2: An NSO stipulation would cover the entire management area, so there would be no environmental effects to sensitive plant habitat.

Alternatives 3-5: Under these alternative 30 percent of the sensitive plant habitat would be covered by NSO stipulations. A lease notice would apply to the remaining 70 percent (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to sensitive plant habitat.

Issue #4: Recreation (Map 6)

Developed Campground

Alternative 2: The entire management area would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 3-4: The Cascade Campground site would be protected by an NSO stipulation, so campground visitors would see no change to the site itself. A ¼ mile buffer around the campground would be protected by a CSU stipulation, where the operator would visually and audibly screen activities from the campground, and by a TL stipulation, where the operator's activities would be precluded from May 15 to September 15 annually. There would be little to no impact to campground users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Alternative 5: An NSO stipulation would be applied to the campground site only. The surrounding area would be leased with Standard Terms. If oil and gas development occurs, the area would appear altered for the duration of the activities. Following reclamation, the area would return to a more natural appearance. The 200 meter offset and the 60 day delay would lessen some of these impacts.

Recreation River

Alternative 2: The entire management area would be protected by an NSO stipulation, so there would be no environmental effects.

Alternatives 3-4: About 35 percent of the West Fork of Rock Creek Recreation River and its buffer within the management area would be covered by an NSO stipulation for other resource protection. The remaining 65 percent would be protected by a TL stipulation, precluding development activities from May 15 to September 15 annually. If occupancy occurs outside of this time period, recreationists along the West Fork of Rock Creek would hear or see oil and gas activities.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Alternative 5: About 35 percent of the West Fork of Rock Creek Recreation River and its buffer within the management area would be covered by an NSO stipulation for other resource protection. The remaining 65 percent would be leased with standard terms. If occupancy occurs, recreationists along the West Fork of Rock Creek would hear or see oil and gas activities. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

4.2.5.6 MA F : BASIN

Issue #1: Soils and Vegetation (Map 1)

Sensitive Plant Habitat

Alternative 2: The entire management area would be covered by an NSO stipulation, so there would be no environmental effects.

Alternatives 2-5: An NSO stipulation would cover 20 percent of the sensitive plant habitat. A lease notice will be applied to the remaining 80 percent (Appendix E).

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Issue #4: Recreation (Map 6)

Developed Campgrounds

Alternative 2: The entire management area would be protected by NSO stipulation, so there would be no environmental effects.

Alternatives 3-4: The Basin Campground site would be protected by an NSO stipulation, so campground visitors would see no change to the site itself. A ¼ mile buffer around the campground would be protected by a CSU stipulation, where the operator would visually and audibly screen activities from the campground, and by a TL stipulation, where the operator's activities would be precluded from May 15 to September 15 annually. There would be little to no impact to campground users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects.

Alternative 5: An NSO stipulation would be applied to the campground site only. The surrounding area would be leased with Standard Terms. If oil and gas development occurs, the area would appear altered for the duration of the activities. Following reclamation, the area would return to a more natural appearance. The 200 meter offset and the 60 day delay would lessen some of these impacts.

Recreation River

Alternative 2: The West Fork of Rock Creek Recreation River and a ¼ mile buffer around it would be protected by NSO stipulation, so there would be no environmental effects.

Alternatives 3-4: Approximately 20 percent of this recreation river and its ¼ mile buffer would be covered by an NSO stipulation for campground protection. The remaining 80 percent would be protected by a TL stipulation, precluding drilling activities from May 15 to September 15 annually. If occupancy occurs outside of this time period, recreationists along the West Fork of Rock Creek would hear or see oil and gas activities.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to users of West Fork of Rock Creek Recreation River.

Alternative 5: Approximately 20 percent of this recreation river and its ¼ mile buffer would be covered by an NSO stipulation for campground protection. The remaining 80 percent would be leased with Standard Terms. If occupancy occurs, recreationists along the West Fork of Rock Creek would hear or see oil and gas activities. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

4.2.5.7 MA F : PALISADES

Issue #4: Recreation (Map 6)

Developed Campgrounds

Alternative 2: The entire management area would be protected by an NSO stipulation, so there would be no environmental effects.

Alternatives 3-4: The Palisades Campground site would be protected by an NSO stipulation, so campground visitors would see no change to the site itself. A ¼ mile buffer around the campground would be protected by a CSU stipulation, where the operator would visually and audibly screen activities from the campground, and by a TL stipulation, where the operator's activities would be precluded from May 15 to September 15 annually. There would be little to no impact to campground users.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to the campground users.

Alternative 5: An NSO stipulation would be applied to the campground site only. The surrounding area would be leased with Standard Terms. If oil and gas development occurs, recreationists would be able to see and hear these activities. The area would appear altered, but following reclamation would return to a more natural appearance. The 200 meter offset and the 60 day delay would lessen some of these impacts.

4.2.5.8 MA F: ROCK CREEK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2: The entire management area would be no lease, so there would be no environmental effects to fragile soils.

Alternative 3: Fragile soils would be protected by an NSO stipulation so there would be no environmental effects.

Alternative 4-5: Less than five percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remainder would be leased with Standard Terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to fragile soils.

Riparian Areas

Alternative 2: The entire management area would be covered by no lease, so there would be no environmental effects to riparian areas.

Alternative 3-5: Riparian areas would be protected by an NSO stipulation so there would be no environmental effects.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to fragile soils.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Fisheries

Alternative 2: The entire management area would be covered by an no lease, so there would be no environmental effects to the presumed population of Cutthroat Trout.

Alternative 3: This area contains a population of Cutthroat Trout, believed to be the genetically pure Yellowstone sub-species. Under this alternative an NSO stipulation would cover 50 percent of the Yellowstone cutthroat trout. The remaining 50 percent would receive a lease notice. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Alternative 4-5: Under this alternative 45 percent of the presumed Yellowstone Cutthroat Trout habitat would receive an NSO stipulation. The remaining 55 percent would be covered by a lease notice. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Alternative 4A: Selection of this alternative would render the entire management area administratively unavailable so there would be no environmental effects.

Issue #3: Aesthetics (Map 2)

Alternative 2: The entire management area would be covered by no lease. A ¼ mile visual corridor buffer surrounding the management area boundary would be leased with a CSU stipulation. There would be no effect on the visual appearance of the area.

Alternative 3: About 35 percent of the management area would be covered by an NSO stipulation for fragile soils, riparian area and campground protection. The rest of the management area would be leased with a TL stipulation, precluding occupancy by oil and gas activities from May 15 to September 15 annually. A ¼ mile visual corridor buffer surrounding the management area boundary would be leased with a CSU stipulation. Some sights and sounds of oil and gas activities may be perceived, but the effects would be minimal.

Alternative 4: About 35 percent of the management area would be covered by an NSO stipulation for fragile soils, riparian area and campground protection. The rest of the management area would be leased with Standard Terms. Where occupancy occurs on this portion, recreationists would possibly hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen possible disturbance. In addition, a ¼ mile visual corridor buffer surrounding the management area would be leased with a CSU stipulation. Some sights and sounds of oil and gas activities may be perceived from this area, but the effects would be minimal.

Alternative 4A: The entire management area would be administratively unavailable. A ¼ mile visual corridor buffer surrounding the management area would also receive an CSU stipulation. There would be no effect on the visual appearance of the area.

Alternative 5: About 15 percent of the management area would be covered by an NSO stipulation for riparian area and campground protection. The rest of the management area would be leased with Standard Terms. Where occupancy occurs on this portion, recreationists would possibly hear and see oil and gas development activities. Views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Issue #4 Recreation (Map 6)

Developed Campgrounds

Alternative 2: The entire management area would be covered by no lease. There would be no effects to campground users.

Alternatives 3-4: Developed campground sites would be protected with an NSO stipulation. A ¼ mile buffer around the campground would be protected with a timing stipulation, precluding drilling activities from May 15 to September 15 annually. There will also be a CSU stipulation in the same ¼ mile buffer, where the operator would be required to visually or audibly screen their presence as much as possible so that their activities would not be evident to recreationists. There would be minimal effects on the views.

Alternative 4A: The entire management area would be administratively unavailable. There would be no effects to campground users.

Alternative 5: The campground site would be protected with an NSO stipulation. Except for riparian areas, the area surrounding the campground would be leased with Standard terms and could change from natural appearing to heavily altered appearance if oil and gas development were to occur.

Trails

Alternative 2: The entire management area would be covered with a no lease stipulation, so there would be no environmental effects to trail users.

Alternative 3: About 30 percent of the trail system and its ¼ mile buffer would be protected with an NSO stipulation for fragile soils and riparian area protection. The remaining 70 percent would be leased with a TL, precluding drilling activities from May 15 to September 15 annually. If occupancy occurs, visitors who utilize the area outside of this period may see or hear oil and gas activities.

Alternative 4: An NSO stipulation would cover 25 percent of the trail buffer. An TL stipulation for the campground buffer would cover 20 percent of the trail buffer. This TL stipulation would preclude surface occupation from May 15 to September 15 annually. The remaining 55 percent would receive standard terms.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to the trail users.

Alternative 5: About 25 percent of the trail system and its ¼ mile buffer would be protected with an NSO stipulation for riparian area protection. The remaining 75 percent would be leased with Standard Terms. Where occupancy occurs, trail users would hear and see oil and gas development activities. Views would appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Recreation River

Alternative 2: The entire management area would be covered by no lease, so there would be no effects to the users of the recreation river.

Alternative 3: About 40 percent of Rock Creek recreation river and its ¼ mile buffer would be covered by NSO stipulations for fragile soils, riparian area and campground protection. The remaining 60 percent would be leased with a TL, precluding drilling activities from May 15 to September 15 annually. If occupancy occurs, visitors who utilize the area outside of this period may see or hear oil and gas activities.

Alternative 4: An NSO stipulation would cover 20 percent of the Rock Creek recreation river and its ¼ mile buffer. An TL stipulation from developed campground buffer would overlap into 25 percent of the recreation river buffer. This TL stipulation would preclude and surface occupation from May 15 to September 15 annually. The remaining 55 percent would receive standard terms. Where occupancy occurs, recreationist could hear and see oil and gas development activities from Rock Creek.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effects to the users of the recreation river.

Alternative 5: About 20 percent of Rock Creek recreation river and its ¼ mile buffer would be covered by NSO stipulations for riparian area and campground protection. The remaining 80 percent would be leased with Standard Terms. Where occupancy occurs, recreationists would hear and see oil and gas development activities from Rock Creek. Views would appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

4.2.5.9: WELL SITE-LAKE FORK ROCK CREEK

The hypothetical Lake Fork Rock Creek Well Site would be located within this management area. This well site is located on moderate oil and gas development potential. Refer to Appendix A and B for more specifics relating to this well site. The environmental effects of occupying this site are discussed below.

Issue #1: Soils and Vegetation (Map 1)

Alternatives 2-5: The well site would not be located on any fragile soils or riparian areas, so there would be no effects on these soils.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Fisheries

Alternatives 2;4A: Because of stipulations for various resource protection, the well site would not be activated.

Alternative 3-5: A lease notice would be applied to Yellowstone Cutthroat Trout habitat (Appendix E).

Issue #3: Aesthetics (Map 2)

Alternatives 2-4A: Because of NL, NSO, or NA stipulations for various resource protection, the well site would not be activated. There would be no effect on the views in the area.

Alternative 5: The site would be occupied under Standard Lease Terms. Recreationists would hear and see oil and gas activities. Views would appear modified for the duration of these activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Issue #4: Recreation (Map 6)

Developed Campgrounds

Alternatives 2-5: The well site would not be located within or adjacent to a developed campground, so there would be no effects on these facilities.

Trails

Alternatives 2-4A: Because of stipulations for various resource protection, the well site would not be activated. There would be no effect on the trails in the area.

Alternative 5: The well site would be occupied under Standard Lease Terms, and would be near one of the trails. Trail users would hear and see oil and gas activities. Views would appear modified for the duration of these activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Recreation River

Alternatives 2-4A: Because of stipulations for various resource protection, the well site would not be activated. There would be no effect on Rock Creek in this area.

Alternative 5: The well site would be occupied under Standard Lease Terms, and would be near Rock Creek. Recreationists would hear and see oil and gas activities. Views would appear modified for the duration of these activities. Following reclamation, the views would again be predominantly natural appearing. Use of the 200 meter offset and the 60 day delay would lessen some of these impacts.

Issue #5: Cultural Resources

Alternatives 2-5: According to the site location model, the well site is within an area of moderate site density. On-the-ground survey of the location revealed no cultural resources. The location is not within view or adjacent to any of the known traditional cultural properties or historic sites so the location of this well site would not cause adverse effects to these sites. There would be no direct effects to known sites.

Issue #7: Quality of Life

Alternative 2-4A: The well site would not be occupied, so there would be no effect on air and water quality.

Alternatives 5: The SCREEN model (Air Quality Report, Project File) was used to compare the dispersion of well site emissions of the Lake Fork Rock Creek Well Site with National Ambient Air Quality standards. All of the modeled concentrations for nitrogen dioxide and particulates would be well within Montana and National Ambient Air Quality Standards and considerably below Class II increment levels. Emission levels during production would be considerably less than exploration, with no anticipated adverse health effects. If the Lake Fork Rock Creek well site was brought into production and no H_2S was encountered, emissions of nitrogen oxides, sulfur dioxide, and carbon monoxide would be negligible. The primary potential air quality impacts would be from road dust particulates from vehicle travel. Only about five acres of land would be disturbed and any impact to water quality from suspended sediments would be extremely small.

4.2.6 G MANAGEMENT AREAS

The following table 4.17 displays resource acreage information by alternative and stipulation for all G Management Areas. Individual management area information can be found in Chapter 3.2.6, Table 3.26.

Table 4.17

Resource Acres by Alternative and Stipulation (G Mgmt. Areas)

(Total Acres 8,490)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-1,690	NSO-1,690	NSO-1,690	NSO-1,690	NSO-1,690	ST-1,690
Sensitive Plant Habitat	NL-600	NSO-570 LN-30	NSO-570 LN-30	NSO-570 LN-30	NSO-570 LN-30	ST-600
Riparian	NL-620	NSO-620	NSO-620	NSO-620	NSO-620	ST-620
Yellowstone Cutthroat Trout						
Presumed	NL-100	NSO-40 LN-60	NSO-40 LN-60	NSO-40 LN-60	NSO-40 LN-60	ST-100
Elk Home Ranges						
Black Butte Summer/Fall	NL-4,240	NSO-4,240	NSO-1,330 TL-2,910	NSO-1,330 ST-2,910	NSO-1,330 TL-2,910	ST-4,240
Moose Home Ranges						
Red Lodge Creek Winter/Spring	NL-210	NSO-210	NSO-20 TL-190	NSO-20 ST-190	NSO-20 TL-190	ST-210
McDonald Basin Winter/Spring	NL-1,190	NSO-1,190	NSO-300 TL-890	NSO-300 ST-890	NSO-300 TL-890	ST-1,190
Bighorn Sheep Home Ranges						
W. Rosebud Winter/ Spring	NL-80	NSO-80	NSO-80	NSO-80	NSO-80	ST-80
Visuals	NL-1,840	NSO-1,840	NSO-1,840	NSO-1,840	NSO-1,840	ST-1,840
Trails	NL-120	NSO-120	NSO-30 TL-90	NSO-30 ST-90	NSO-30 TL-90	ST-120
Roadless	NL-4,630	NSO-4,630	NSO-1,590 TL-2,180 ST-860	NSO-1,590 ST-3,040	NSO-1,590 TL-2,180 ST-860	ST-4,630

4.2.6.1 MA G : FISHTAIL

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2-4A: Fragile soils would be leased with an NSO stipulation, so there would be no environmental effects.

Alternative 5: Fragile soils would be leased with standard terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water and wind erosion would be higher until reclamation is successful.

Riparian Areas

Alternative 2-4A: Riparian areas would be leased with an NSO stipulation, so there would be no environmental effects.

Alternative 5: Riparian areas would be protected by standard lease terms. The 200 meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated by standard terms, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause gullying. A lease notice for riparian areas would be applied (Appendix E).

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: Under this alternative, 100 percent of the summer/fall home range used by the Black Butte Elk herd would receive a NSO stipulation. It is anticipated that this level of resource protection would result in minimal direct or indirect effect to elk which use this area.

Alternative 3;4A: Under this alternative, the summer/fall home range used by the Black Butte Elk herd would receive two types of stipulations. Approximately 30 percent of this seasonal home range would be leased with a NSO stipulation. The remaining 70 percent of this seasonal home range would be leased with a TL stipulation. Under the terms of the lease, occupation of this seasonal home range would be precluded from June 1 to November 1 each year. It is anticipated that this level of resource consideration is sufficient to reduce or minimize adverse direct or indirect effects to elk which use this management area.

Alternative 4: Under this alternative, the summer/fall home range used by the Black Butte Elk herd would receive two types of stipulations. Approximately 30 percent of this seasonal home range would be leased with a NSO stipulation. The remaining 70 percent of this seasonal home range would receive standard terms.

The Black Butte Elk herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this elk seasonal home range. Selection of this alternative could have adverse direct and indirect effects to elk within this management area. At a minimum, displacement of elk from the seasonal home range to sub-optimum range would be anticipated.

Alternative 5: Under this alternative, the summer/fall home range used by the Black Butte Elk herd would receive standard terms. The Black Butte Elk herd typically uses the summer/fall home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this elk seasonal home range. Selection of this alternative would result in adverse direct and indirect effects to elk which use this management area. At a minimum, displacement of elk from the seasonal home range to sub-optimum range would be anticipated.

Moose

Alternative 2: Via this alternative, 100 percent of the McDonald Basin Moose herd year long home range would receive a NSO stipulation. This level of resource consideration should result in minimum direct or indirect effects to moose which utilize this management area.

Alternative 3;4A: Selection of this alternative would lease areas utilized by the McDonald Basin Moose herd as winter/spring home ranges with two types of stipulations. Approximately 25 percent of this seasonal home range would be leased with a NSO stipulation. The remaining 75 percent of this winter/spring home range would be leased with a TL stipulation. Under the terms of the lease, oil and gas activities could not occupy this portion of the seasonal home range used by the McDonald Basin Moose herd, from October 15 to June 15 each year.

It is anticipated that this level of resource consideration is sufficient to reduce or minimize adverse direct and indirect effects to the McDonald Basin Moose herd during their use of this management area.

Alternative 4: Via this alternative, the year long home range used by the McDonald Basin Moose herd would receive two types of stipulations. Approximately 25 percent of this seasonal home range would be leased with a NSO stipulation. The remaining 75 percent of this seasonal home range would be leased with standard terms.

The McDonald Basin Moose herd typically uses the year long home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. It is anticipated that selection of this alternative would have adverse direct and indirect effects to moose which utilize this management area. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Alternative 5: Via this alternative, 100 percent of the year long home range used by the McDonald Basin Moose herd would receive standard terms. The McDonald Basin Moose herd typically uses the year long home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. Selection of this alternative would be expected to result in adverse direct and indirect effects to moose which use this management area. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Bighorn Sheep

Alternatives 2-4A: Under these alternative, 100 percent of the West Rosebud Bighorn Sheep's winter/spring home range would receive a NSO stipulation. It is anticipated that selection of this alternative would minimize any direct or indirect effects to the West rosebud Bighorn Sheep herd which uses this area.

Alternative 5: Under this alternative, 100% of the winter/spring home range used by the West Rosebud Bighorn Sheep herd would receive standard terms. The West Rosebud Bighorn Sheep herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within this seasonal home range. Selection of this alternative would result in adverse direct and indirect effects to bighorn sheep which utilize this management area. At a minimum, displacement of bighorn sheep from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Visuals

Alternative 2-4A: Slopes over 40 percent would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Slopes over 40 percent would be protected by standard lease terms. Those portions of this management area that are developed would change from a natural appearing landscape to one that is modified for the specific development site. Views from off-site may appear modified for the duration of the oil and gas activity. After that, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Trails

Alternative 2: The trail system and its ¼ mile buffer would be covered by NSO stipulations for protection of riparian areas and elk summer range. There would be no impacts to trail users.

Alternative 3;4A: Approximately 25 percent of the trail system and its ¼ mile buffer would be covered by NSO stipulations for protection of riparian areas. The remaining 75 percent would be protected by a TL stipulation for elk summer range, which would preclude any oil and gas activities from May 15 to September 15 annually. This portion would also have a CSU stipulation, where the operator would be required to screen their activities from the trail. Some oil and gas activities may be evident from the trails, but effects would be minimal.

Alternative 4: Approximately 25 percent of the trail system and its ¼ mile buffer would be covered by NSO stipulations for protection of riparian areas. The remaining 75 percent would be protected by a TL stipulation for elk summer range, which would preclude any oil and gas activities from May 15 to September 15 annually. Some oil and gas activities may be evident from the trails, especially outside of the TL period, but effects would be minimal.

Alternative 5: Trails would be protected by standard lease terms. If occupancy occurs, trail users would possibly hear and see oil and gas development activities. Use of the 200 meter offset and the 60 day delay would lessen some of the disturbance to trail users.

Issue #6: Roadless (Map 2)

Alternative 2: The Fishtail Saddleback Roadless Area would be protected by NSO stipulations, so there would be no environmental effects.

Alternative 3,4A: About 20 percent of the Fishtail Saddleback Roadless Area would be covered by NSO stipulations for riparian area and steep slope protection. An TL stipulation for Black Butte summer/fall range would overlap into 70 percent of the roadless area. The TL stipulation would preclude surface occupation from June 1 to November 1 annually. The remaining 10 percent would be leased with standard lease terms. Where occupancy occurs, the roadless character of the area would be affected.

Alternative 4: About 20 percent of the roadless area would be covered by an NSO stipulation. The remaining 80 percent would receive standard terms. Where occupancy occurs, the roadless character would be affected due to increased noise and traffic from oil and gas activities.

Alternative 5: The Fishtail Saddleback Roadless Area would be leased with standard terms. Where occupancy occurs, the roadless character of the area would be affected due to increased noise and traffic from oil and gas activities.

4.2.6.2 MA G : RED LODGE

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternatives 2-4A: An NSO stipulation would be applied to all fragile soils within this management area. Therefore, there would be no effects to fragile soils

Alternative 5: Fragile soils would be protected by standard lease terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Riparian

Alternatives 2-4A: NSO stipulation would be applied to riparian areas within this management area, so there would be no environmental effects.

Alternative 5: Riparian area would be protected by standard lease terms. The 200 meter location offset of the well site allowed under standard terms would be utilized to mitigate the effects to most riparian areas. Where riparian areas could not be mitigated by standard terms, vegetative control of flow velocity and sediment and soil retention would be reduced. Road and pad construction may cause gullying.

Sensitive Plant Habitat

Alternatives 2-4A: A lease notice would be applied to sensitive plant habitat. However, about 95 percent of this habitat would already be covered by NSO stipulations for other resource protection.

Alternative 5: A lease notice would be applied to sensitive plant habitat (Appendix E).

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Fisheries

Alternatives 2-4A: This area contains a population of Cutthroat Trout, believed to be the genetically pure Yellowstone sub-species. Under these alternatives, 40 percent of the area would be covered by an NSO stipulation. An lease notice will be issued for the remaining 60 percent of the area where Yellowstone cutthroat trout are presumed to occur. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Alternative 5: An lease notice will be issued for the 100 percent of the area where Yellowstone cutthroat trout are presumed to occur. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Moose

Alternative 2: Under this alternative, 100 percent of the winter/spring home range used by the Red Lodge Creek Moose herd would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize adverse direct and indirect effects to the Red Lodge Moose herd use of this management area.

Alternatives 3,4A: Via these alternative, the winter/spring home range within this management area, used by the Red Lodge Creek Moose herd would receive two types of stipulations. Approximately 10 percent of this home range would receive an NSO stipulation. The remaining 90 percent of this seasonal home range would receive a TL stipulation. Under the terms of the lease occupation of this area would be precluded from October 15 to June 15 each year. It is anticipated that this level or resource protection would be sufficient to prevent or minimize direct or indirect effects to moose which use this management area.

Alternative 4: Under this alternative, the winter/spring home range within this management area, used by the Red Lodge Creek herd would receive two levels of resource considerations. Approximately 10 percent of this home range would receive an NSO stipulation. The remaining 90 percent of this seasonal home range would receive standard terms.

The Red Lodge Creek Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of moose from these seasonal home range to sub-optimum range would be anticipated.

Alternative 5: Via this alternative, 100 percent of the winter/spring home range used by the McDonald Basin Moose herd would receive standard terms. The Red Lodge Creek Moose herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within moose seasonal home ranges. At a minimum, displacement of moose from currently occupied seasonal home range to sub-optimum range would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: About 50 percent of the management area, including all slopes over 40 percent, would be protected by NSO stipulations. There would be no effects on the views in these areas.

Alternative 3-4A: All areas greater than 40 percent slope would not be occupied through an NSO stipulation. There would be no effect on the views in these visually sensitive areas.

Alternative 5: Areas of slopes over 40 percent would be leased with standard terms. Where occupancy occurs, views from off-site may appear modified for the duration of activities. Following reclamation, the views would again be predominantly natural appearing.

Issue #6: Roadless (Map 2)

Alternative 2: The Burnt Mountain Roadless Area would be protected by an NSO stipulation, so there would be no environmental effects.

Alternative 3-4A: Approximately 60 percent of the Burnt Mountain Roadless Area would be covered by NSO stipulations for other resource protection. The remaining 40 percent would be leased with standard lease terms. Where occupancy occurs, the roadless character of the area may be affected from increased noise and traffic from oil and gas activities.

Alternative 5: The Burnt Mountain Roadless Area would be leased with standard terms. Where occupancy by oil and gas activities occurs, the roadless character of the area would be affected from increased noise and traffic associated with oil and gas activities.

4.2.7 P MANAGEMENT AREAS:

The following table 4.18 displays resource acreage information by alternative and stipulation for all P Management Areas. Individual management area information can be found in Chapter 3.2.7; Table 3.27.

Table 4.18
Resource Acres by Alternative and Stipulation (P Mgmt. Areas)
(Total Acres 360)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
Sensitive Plant Habitat	NL-60	NSO-60	NSO-60	NSO-60	NSO-60	NSO-10 LN-50
Riparian	NL-30	NSO-30	NSO-30	NSO-30	NSO-30	NSO-30
Elk Home Ranges Meyers Creek Winter/Spring	NL-250	NSO-250	NSO-250	NSO-250	NSO-250	NSO-10 ST-240
Recreation River W. Fork Rock Creek	NL-40	NSO-40	NSO-40	NSO-40	NSO-40	NSO-10 ST-30
Cultural (Site) (Buffer .25 MI)	NL-30	NSO-30 NSO	NSO-30 NSO	NSO-30 NSO	NSO-30 NSO	NSO-30 CSU

4.2.7.1 MA P : MEYERS CREEK

Riparian Areas

Alternatives 2-5: Riparian areas would be protected with an NSO stipulation, so there would be no environmental effects.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternatives 2-4A: Under these alternatives, 100 percent of the Meyers Creek Elk herd's winter/spring range, contained within this management area, would receive a NSO stipulation. It is anticipated that this level of resource consideration is sufficient to reduce or minimize adverse direct or indirect effects to the Meyers Creek Elk herds use of this seasonal home range which occurs within this management area.

Alternative 5: Via this alternative, the Meyers Creek Elk winter/spring range contained within this management area, would receive two levels of resource considerations. Approximately 5 percent of the seasonal home range used by this herd would receive a NSO stipulation. The remaining 95 percent of this winter/spring home range would receive standard terms.

The Meyers Creek Elk herd typically uses the winter/spring home range within this management area for periods of time exceeding 60 days. Additionally, relocation of the well site by 200 meters would not remove the disturbance activity from within elk seasonal home ranges. At a minimum, displacement of elk from these seasonal home ranges to sub-optimum range would be anticipated.

Issue #5: Cultural Resources

Alternatives 2-4A: Meyers Creek Ranger Station that is located in this management area would be protected by an NSO stipulation for the site and for ¼ mile from the site boundary. There would be no direct impact to the sites.

Alternative 5: Meyers Creek Ranger Station would be protected by an NSO stipulation for the site and a CSU stipulation for ¼ mile from the site boundary. There would be an increased possibility for impact to these sites over the other alternatives.

4.2.7.2 MA P : ROCK CREEK

Issue #1: Soils and Vegetation (Map 1)

Sensitive Plant Habitat

Alternatives 2-4A: Sensitive plant habitat would be covered by an NSO stipulation, so there would be no environmental effects.

Alternative 5: Sensitive plant habitat would be protected by a lease notice (Appendix E). About 20 percent of this habitat could be covered by an NSO stipulation for riparian area protection.

Riparian Areas

Alternative 2-5: Riparian area would be protected by an NSO stipulation, so there would be no environmental effects.

Issue #4: Recreation (Map 6)

Recreation River

Alternatives 2-4A: The entire management area would be covered by an NSO stipulation so there would be no effects to river users.

Alternative 5: The area immediately adjacent to the West Fork of Rock Creek would be covered by an NSO stipulation for riparian area protection. The remaining 75 percent of the area within ¼ mile of the West Fork of Rock Creek would be covered by standard terms. Where occupancy occurs, oil and gas activities may be seen or heard from the creek.

Issue #5: Cultural Resources

Alternative 2-4A: Rock Creek Ranger Station is located in this management area and would be protected by an NSO stipulation for the site and for ¼ mile from the site boundary to protect the site setting. There would be no direct effects to this site.

Alternative 5: Rock Creek Ranger Station would be protected by an NSO stipulation for the site and a CSU stipulation for ¼ mile from the site boundary to protect the site setting. There would be an increased possibility for impacts to this site over the other alternatives.

4.2.8 R MANAGEMENT AREAS:

The following table 4.19 displays resource acreage information by alternative and stipulation for all R Management Areas. Individual management area information can be found in Chapter 3.2.8; Table 3.28.

Table 4.19
Resource Acres by Alternative and Stipulation (R Mgmt. Areas)
(Total Acres 18,030)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-8,370	NL-8,370	NSO-8,370	NSO-8,370	NA-8,730	NSO-280 CSU-8,090
Sensitive Plant Habitat	NL-1,930	NL-1,930	NSO-1,930	NSO-1,060 CSU-870	NA-1,930	NSO-300 CSU-1,630
Riparian	NL-970	NL-970	NSO-970	NSO-970	NA-970	NSO-970

	1	2	3	4	4A	5
Elk Home Ranges						
Hellroaring/Silver Run Winter/Spring	NL-740	NL-740	NSO-740	NSO-740	NA-740	NSO-20 CSU-720
Silver Run Summer/Fall	NL-180	NL-180	NSO-180	NSO-130 TL-50	NA-180	CSU-180
Wild Bill Picnic Area	NL-30	NL-30	NSO-30	NSO-20 CSU-10	NA-30	NSO-20 CSU-10
Recreation Residences & Organizational Camps	NL-50	NL-50	NSO-50	NSO-20 CSU-30	NA-50	CSU-50
Trails	NL-4,400	NL-4,400	NSO-4,400	NSO-3,900 CSU-500	NA-4,400	NSO-410 CSU-3,990
Recreation River W. Fork Rock Creek	NL-2,690	NL-2,690	NSO-2,690	NSO-1,850 CSU-840	NA-2,690	NSO-330 CSU-2,360
Cultural (Sites) (Buffer .25 Mi.)	NL-40	NL-40 NL	NSO-40 NSO	NSO-40 NSO	NSO-40 NSO	NSO-40 CSU
Roadless	NL-14,570	NL-14,570	NSO-14,570	NSO-14,120 CSU-420 TL-30	NA-14,570	NSO-580 CSU-13,990
Municipal Watershed	NL-18,090	NL-18,090	NSO-18,090	NSO-16,260 CSU-1,800	NA-18,090	NSO-970 CSU-17,090

4.2.8.1 MA R: WEST FORK ROCK CREEK

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2: The entire management area would be covered by no lease, so there would be no environmental effects to fragile soils.

Alternative 3-4: An NSO stipulation would be applied to all fragile soils, so there would be no environmental impacts.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to fragile soils.

Alternative 5: Less than five percent of fragile soils would be covered by an NSO stipulation for riparian area protection. Standard terms would be applied to the remaining 95 percent. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult, especially alpine reclamation, and the potential for offsite sedimentation and wind and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2: The entire management area would be covered by no lease, so there would be no environmental effects to sensitive plant habitat.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on sensitive plants.

Alternative 4: A lease Notice would be applied to sensitive plant habitat (Appendix E). However, about 55 percent would already be covered by NSO stipulations for other resource protection.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to sensitive plant habitat.

Alternative 5: A lease Notice would be applied to sensitive plant habitat (Appendix E). However, about

30 percent would already be covered by an NSO stipulation for fragile soils and riparian area protection.

Riparian Areas

Alternative 2: The entire management area would be covered by no lease, so there would be no environmental effects to fragile soils.

Alternative 3-5: An NSO stipulation would be applied to all riparian areas, so there would be no environmental effects.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no environmental effects to riparian areas.

Issue #2: Fish and Wildlife (Maps 3, 4, 5 and 7)

Elk

Alternative 2: The entire management area would be covered by no lease, so there would be no effects to the Hellroaring/Silver Run winter/spring or Silver Run summer/fall home ranges.

Alternatives 3: Under these alternatives, 100 percent of the Hellroaring/Silver Run winter/spring home range would receive a NSO stipulation. Additionally, 100 percent of the Silver Run Summer/fall home range would receive an NSO stipulation. It is anticipated that this level of resource consideration will reduce or minimize adverse direct and indirect effects to elk which utilize this management area.

Alternative 4: Selection of this alternative would result in leasing 100 percent of the jointly occupied Silver Run/Hellroaring winter/spring home range with a NSO stipulation. No direct or indirect effect to wildlife resources which use this area would be anticipated.

Additionally, this management area supplies summer/fall home range for the Silver Run Elk herd. Selection of this alternative would lease approximately 85 percent of this area with a NSO stipulation. An TL stipulation for the Silver Run/Hellroaring winter/spring home range would overlap into 15 percent of the Silver Run summer/fall home range. This TL stipulation would preclude any surface occupancy from November 30 to July 1 annually. This timing period would offer little protection during their occupation of the summer/fall home range. Displacement to sub-optimum habitats could be possible from July 1 to November 1.

Alternative 4A: Selection of this alternative would preclude leasing the entire management area and there would be minimal direct and indirect effects to elk which seasonally use this area.

Alternative 5: Under this alternative, seasonal elk home ranges within this management area would receive either a Controlled Surface Use (CSU) or a combination of CSU and NSO stipulations. All (100 percent) of summer/fall home range used by the Silver Run Elk herd would receive a CSU stipulation. This type of stipulation is intended to require the operator to visually or audibly screen the presence of the drilling program to the extent possible. This level of stipulation offers little protection to wildlife values. At a minimum, displacement of elk would be anticipated.

In addition, the winter/spring home range, jointly occupied by the Silver Run and Hellroaring Elk herds would receive two types of stipulations. Approximately 5 percent of this home range would have a NSO stipulation. The remaining 95 percent of this seasonal home range, would receive a CSU stipulation. The consequences of this stipulation is described above, and would equally apply in this instance.

Issue #3: Aesthetics (Map 2)

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the views in the area.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on the views in the area.

Alternative 4: Areas with slopes over 30 percent (90 percent of the management area) would be protected by an NSO stipulation, and those areas with slopes under 30 percent (ten percent of the management area) would protected by a CSU stipulation for municipal watershed protection. The operator would be required to visually or audibly screen their presence as much as possible. There would be minimal effects on the views in the area.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on the views in the area.

Alternative 5: About five percent of the management area would be covered by an NSO for riparian area protection. The remaining 95 percent would be covered by a CSU stipulation for municipal watershed protection. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Trails

Alternative 2: The entire management area would be covered by no lease, so there would be no environmental effect on trails in the area.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on trails in the area.

Alternative 4: Approximately 90 percent of the trail system and its ¼ mile buffer would be protected by an NSO stipulation for other resource considerations. The remaining ten percent would be covered by a CSU stipulation for protection of the municipal watershed. The operator would be required to visually or audibly screen their presence as much as possible. There would be minimal effects on trails in the area.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on trails in the area.

Alternative 5: Less than five percent of the trail system and buffer would be covered by an NSO stipulation for riparian area protection. The remainder would be covered by a CSU stipulation for protection of the municipal watershed. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views from the trails would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Recreation River

Alternative 2: The entire management area would be covered by no lease, so there would be no effect to users of the West Fork of Rock Creek within this management area.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on the West Fork of Rock Creek within this management area.

Alternative 4: Approximately 70 percent of the West Fork of Rock Creek and its ¼ mile buffer would be covered by NSO stipulations for other resource protection. The remaining 30 percent would be covered by a CSU stipulation for municipal watershed protection. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views from the river would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect to users of the recreation river.

Alternative 5: Approximately 15 percent of the recreational river and buffer would be covered by an NSO stipulation for riparian area protection. The remaining 85 percent would be covered by a CSU stipulation for protection of the municipal watershed. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views from the West Fork of Rock Creek would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Recreation Residences and Organizational Camps

Alternative 2: The entire management area would be covered by no lease, so there would be no effect to the recreational residences and organization camps within this management area.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on the recreational residences and organizational camps in this management area.

Alternative 4: Approximately 40 percent of the area occupied by recreational residences and organizational camps would be covered by an NSO stipulation for other resource protection. The remaining 60 percent would be covered by a CSU stipulation for municipal watershed protection. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views from these residences and camps would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect to the recreational residences and organization camps within this management area.

Alternative 5: The area around the Recreation Residences and Organizational Camps would be covered by a CSU stipulation for protection of the municipal watershed. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views from these residences and camps would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Wild Bill Picnic Area

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the Wild Bill Picnic Area.

Alternative 3: An NSO stipulation would be applied to the entire area for protection of the municipal watershed, so there would be no effect on the Wild Bill Picnic Area.

Alternative 4-5: An NSO stipulation would be applied to 70 percent of the Wild Bill Picnic Area for riparian area protection. The remaining 30 percent would be covered by an CSU stipulation. The operator would be required to visually or audibly screen their presence ans much as possible.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on the Wild Bill Picnic Area.

Issue #5: Cultural Resources

Alternative 2: Wild Bill Lake site and Camp Senia Historic Districts would be covered by an no lease, so there would be no direct effects.

Alternatives 3-4: The one historic site, Wild Bill Lake, and the Camp Senia Historic District area that are located within this management area would be protected by an NSO stipulation for the site area and for ¼ mile from the site boundary. There would be no direct impact to the sites.

Alternative 4A: Wild Bill Lake site and Camp Senia Historic District are located within the area set aside as "not available" under this alternative. There will be no direct effects to the sites.

Alternative 5: The two sites that are located in this management area would be protected by an NSO stipulation for the site area and a CSU stipulation for ¼ mile from the site boundary. There would be an increased possibility for impact to these sites over the other alternatives.

Issue #6: Roadless (Map 2)

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the roadless area.

Alternative 3: An NSO stipulation would be applied to the entire area, so there would be no effect on the roadless area.

Alternative 4: Approximately 95 percent of the roadless area would be covered by NSO stipulations for other resource protection. An TL stipulation from Hellroaring/Silver Run Elk Winter/Spring home range would overlap on 1 percent of the roadless area. This TL stipulation would not provide adequate protection during peak visitor seasons. The remaining four percent would be covered by a CSU stipulation for municipal watershed protection. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views would not appear greatly modified. However, where occupancy occurs, the roadless character of the area would be affected.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on the roadless area.

Alternative 5: Less than 5 percent of the roadless area would be covered by an NSO stipulation for riparian area protection. The remaining 95+ percent would be covered by a CSU stipulation for protection of the municipal watershed. The operator would be required to visually or audibly screen their presence as much as possible. However, where occupancy occurs, the roadless character of the area would be affected.

Issue #7: Quality of Life

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the water quality for the city of Red Lodge.

Alternative 3: An NSO stipulation would be applied to the entire management area. Therefore, there would be no effects on the water quality for the city of Red Lodge.

Alternative 4: An NSO stipulation would be applied to approximately 95 percent of the management area. A CSU stipulation would be applied to the remaining five percent, which would be designed to reduce potential for sedimentation and to maintain water quality standards. There would be little to no effect on the water quality. There would be a potential, although small, for chemical spills or leaks contaminating the water, either on-site or along the roads.

Alternative 4A: The entire management area would be administratively unavailable, so there would be no effect on the water quality for the city of Red Lodge.

Alternative 5: An NSO stipulation would be applied to approximately five percent of the management area. A CSU stipulation would be applied to the remaining 95 percent, which would be designed to reduce potential for sedimentation and to maintain water quality standards. Effects to water quality include a potential for chemical spills or leaks contaminating the water, either on-site or along the roads, and a potential for soil erosion until revegetation is established.

4.2.8.2: HYPOTHETICAL WELL SITE-SILVER RUN

The hypothetical Silver Run Well Site would be located within this management area. This well site is located on moderate oil and gas development potential. Refer to Appendix A and B for more specifics relating to this well site. The environmental effects of occupying this site are discussed below.

Issue #1: Soils and Vegetation (Map 1)

Alternative 2-5: The well site would not be located on any fragile soils, sensitive plant habitat or riparian areas, so no environmental impacts would occur to these resources.

Issue #2: Fish and Wildlife

Elk

Alternatives 2-5: The elk herds discussed above do not use this area as a seasonal home range component. Therefore, no direct or indirect effects to these wildlife species would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2-4A: The well site would not be occupied due to an NL, NA, or NSO stipulation, so there would be no effect on the views.

Alternative 5: A CSU stipulation would be applied to the well site. The operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but the view from off-site would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation

Alternative 2-5: The well site would not be located within the recreational trail system, the recreation river, the recreational residences or organizational camps, or the the Wild Bill Picnic Area. There would be no effects on these areas.

Issue #5: Cultural Resources

Alternatives 2-5: According to the site occasion model, the well site is within an area of low site density. On-the-ground survey of the location revealed no cultural resources. The location is not within view or adjacent to Wild Bill Lake or the Camp Senia Historic District, or any of the known traditional cultural properties. The well site would not affect any of the known cultural resources.

Issue #6: Roadless (Map 2)

Alternatives 2-5: While not located within a wilderness or roadless area, the well site would be located in a narrow intrusion into a roadless area. This site would not be occupied under Alternatives 2 thru 4A. In Alternative 5 the well site would be covered by a CSU stipulation, where the operator would be required to visually or audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard within the roadless area, but the roadless character of the area would not be affected.

Issue #7: Quality of Life

Alternative 2-4A: The well site would not be occupied, so there would be no effect on air and water quality.

Alternatives 5: The SCREEN model (Air Quality Report, Project File) was used to compare the dispersion of well site emissions of the Silver Run Well Site with National Ambient Air Quality standards. All of the modeled concentrations for nitrogen dioxide and particulates would be well within Montana and National Ambient Air Quality Standards and considerably below Class II increment levels. Emission levels during production would be considerably less than exploration, with no anticipated adverse health effects. If the Silver Run site well was brought into production and no H_2S was encountered, emissions of nitrogen oxides, sulfur dioxide, and carbon monoxide would be negligible. The primary potential air quality impacts would be from road dust particulates from vehicle travel. Only about ten acres of land would be disturbed and any impact to water quality from suspended sediments would be extremely small.

4.2.9 T MANAGEMENT AREAS

The following table 4.20 displays resource acreage information by alternative and stipulation for all T Management Areas. Individual management area information can be found in Chapter 3.2.9; Table 3.29.

Table 4.20

Resource Acres by Alternative and Stipulation (T Mgmt. Areas)
(Total Acres 20,730)

RESOURCE	ALTERNATIVES					
	1	2	3	4	4A	5
High Hazard and Fragile Soils	NL-8,050	NL-8,050	NSO-8,050	NSO-8,050	NA-7,730 NSO-320	NSO-390 CSU-7,660
Sensitive Plant Sites	NL-20	NL-20	NSO-20	NSO-20	NA-20	LN-20
Sensitive Plant Habitat	NL-2,010	NL-2,010	NSO-2,010	NSO-2,010	NA-2,010	NSO-50 CSU-1,960
Riparian	NL-390	NL-390	NSO-390	NSO-390	NA-120 NSO-270	NSO-390
Yellowstone Cutthroat Trout						
Presumed	NL-220	NL-220	NSO-220	NSO-50 TL-100 CSU-70	NA-220	CSU-220
Elk Home Ranges						
Line Creek Winter/Spring	NL-200	NL-200	NSO-200	NSO-190 TL-10	NA-200	CSU-200
Line Creek Summer/Fall	NL-2,050	NL-2,050	NSO-2,050	NSO-1,740 TL-310	NA-2,050	CSU-2,050
Hellroaring/Silver Run Winter/Spring	NL-1,500	NL-1,500	NSO-1,500	NSO-1,420 TL-80	NA-440 NSO-870 TL-190	CSU-1,500
Hellroaring Summer/Fall	NL-220	NL-220	NSO-220	NSO-220	NSO-220	NSO-10 CSU-210
Bighorn Sheep Home Ranges						
Rock Creek Winter/Spring	NL-3,540	NL-3,540	NSO-3,540	NSO-3,380 TL-160	NA-1,710 NSO-1,750 TL-80	NSO-100 CSU-3,440

	1	2	3	4	4A	5
Visuals	NL-17,360	NL-17,360	NSO-17,360	NSO-17,360	NA-11,120 NSO-6,240	NSO-100 CSU-17,260
Visual Corridors	NL-3,430	NL-3,430	NSO-3,430	NSO-2,960 TL-70 CSU-400	NA-2,360 NSO-910	NSO-30 CSU-3,400
Trails	NL-3,170	NL-3,170	NSO-3,170	NSO-2,910 TL-10 CSU-250	NA-1,980 NSO-1,090 TL/CSU-100	NSO-180 CSU-2,990
Recreation River						
Rock Creek	NL-290	NL-290	NSO-290	NSO-190 CSU-100	NA-40 NSO-170 TL/CSU-80	CSU-290
Lake Fork	NL-1,480	NL-1,480	NSO-1,480	NSO-950 TL-250 CSU-280	NA-930 NSO-360 TL-80 TL/CSU-110	NSO-10 CSU-1,470
Roadless	NL-14,690	NL-14,690	NSO-14,690	NSO-13,750 TL-130 CSU-810	NA-9,820 NSO-4,460 TL-90 TL/CSU-320	NSO-80 CSU-14,610
Organizational Camps; Vista Point	NL-30	NL-30	NSO-30	CSU-30	NA-30	CSU-30

4.2.9.1 MA T : SCENIC BYWAY

Issue #1: Soils and Vegetation (Map 1)

Soils

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the fragile soils.

Alternatives 3-4: An NSO stipulation would be applied to all fragile soils, so there would be no environmental effects.

Alternative 4A: The fragile soils within this management area would be covered 100 percent as administratively unavailable, so there would be no effects.

Alternative 5: Five percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. The remaining 95 percent would be leased with Standard Terms. Where fragile soils could not be mitigated by the 200 meter offset or the 60 day delay, reclamation would be more difficult and the potential for offsite sedimentation and water erosion would be higher until reclamation is successful.

Sensitive Plants

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the sensitive plant habitats.

Alternatives 3-4: An NSO stipulation would be applied to known sensitive plant sites, and a Lease Notice would be applied to sensitive plant habitat (Appendix E). However, all of these areas would already be covered by an NSO stipulation for protection of fragile soils, so there would be no environmental effects.

Alternative 4A: One hundred percent of the sensitive plant habitat would be administratively unavailable, so there would be no effects.

Alternative 5: A Lease Notice would be applied to sensitive plant habitat and known sites. However, an NSO stipulation would cover two percent of the sensitive plant habitat.

Riparian Areas

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the riparian areas.

Alternatives 3-5: An NSO stipulation would be applied to all riparian areas, so there would be no environmental effects.

Alternative 4A: An NSO stipulation would cover 60 percent of the riparian areas. The remaining 40 percent would be administratively unavailable. There would be no effect on the riparian areas under this alternative.

Issue #2 Fish and Wildlife (Maps 3, 4, 5 and 7)

Fisheries

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the presumed Cutthroat Trout.

Alternative 3: An NSO stipulation would cover the entire management area, so there would be no effect on the presumed Cutthroat Trout.

Alternative 4: An NSO stipulation would cover 20 percent of the Cutthroat Trout area. The remaining 80 percent an TL or CSU stipulation would apply. These two stipulations would not provide adequate protection. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Alternative 4A: Under this alternative 30 percent of the Cutthroat Trout area would be administratively unavailable. An NSO stipulation would cover 20 percent of the area of Cutthroat Trout. The remaining 50 percent would be covered by an TL or TL/CSU stipulation. These two stipulations would not provide adequate protection. Detailed surveys and inventories of all Yellowstone cutthroat trout populations and habitats will be required for all potential site development.

Elk

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the elk herds within this area.

Alternative 3: This management area provide seasonal home ranges for three different elk herds (Line Creek, Hellroaring, and Silver Run). Under this alternative, 100 percent of seasonal home ranges would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize adverse direct and indirect effects to elk which use this management area.

Alternative 4: Under this alternative, elk seasonal home ranges contained within this management area would receive two types of stipulation. Approximately 95 percent of the winter/spring home range used by the Line Creek Elk herd would be receive a NSO stipulation. The remaining 5 percent would receive a TL stipulation. Under the terms of the lease, occupation of this area would not be allowed from November 30 to July 1 each year.

This management unit also provides summer/fall home range for the Line Creek herd. Via this alternative, approximately 95 percent of this seasonal home range would experience a NSO stipulation. An TL stipulation from Rock Creek Bighorn Sheep Winter/Spring Range would overlap onto 5 percent of the Line Creek Elk summer/fall range. This TL stipulation would not provide adequate protection and would not remove the disturbance from the home range, but would reduce the sphere of influence surrounding the activity. This type of stipulation affords little benefit to wildlife.

Additionally the winter/spring home range, jointly used by the Silver Run and Hellroaring Elk herds, would receive two types of stipulation. Approximately 80 percent of this area would receive a NSO stipulation. The remaining 20 percent of this seasonal home range would be receive a TL stipulation. Under the terms of the lease, this area would be precluded from occupation from November 30 to July 1 each year.

Lastly, 100 percent of the summer/fall home range used by the Hellroaring Elk herd would be receive a NSO stipulation.

It is anticipated that this level of resource protection is sufficient to reduce or minimize direct or indirect effects to elk and their required habitats within this management area.

Alternative 4A: Selection of this alternative would render 100 percent of both the Line Creek Elk's winter/spring home range and the summer/fall home range administratively unavailable.

The winter/spring home range jointly used by the Hellroaring and Silver Run Elk herds, within this management area would receive three levels of treatment due to selection of this alternative. Approximately 30 percent of this seasonal home range would be administratively unavailable. Approximately 60 percent of this area would be leased with a NSO stipulation. Finally, the remaining 10 percent of this seasonal home range would leased with a TL stipulation. Under the terms of the lease, occupation of this portion of the Hellroaring Elk's seasonal home range could not be occupied by oil and gas activities from November 30 to July 1 each year.

Lastly, 100 percent of the Hellroaring Elk's summer/fall home range contained within this management unit, would be leased with a NSO stipulation.

Overall, this alternative, would be anticipated to prevent or minimize any adverse direct or indirect effects to elk which use seasonal home ranges within this management area.

Alternative 5: Via this alternative, 100 percent of the Line Creek Elk winter/spring home range, Line Creek Elk Summer/Fall home range, and the jointly used Silver Run/Hellroaring Elk winter/spring home range would receive an CSU stipulation. Under the terms of a CSU lease, operators would required to screen the visual and audible impacts of a drilling project to the extent possible. This would not remove the disturbance from the home range, but would reduce the sphere of influence surrounding the activity. This type of stipulation affords little benefit to wildlife. At a minimum displacement from optimum to sub-optimum habitat would be anticipated.

Additionally, via this alternative, approximately 5 percent of the Hellroaring summer/fall home range would receive a NSO stipulation. The remaining 95 percent would have a CSU stipulation. The anticipated effects of a CSU stipulation is described above and holds true for this home range consideration. Under the terms of a NSO lease, ground disturbances associated with exploration, development, and production would be precluded.

Bighorn Sheep

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the bighorn sheep winter/spring home range.

Alternative 3: Via this alternative, 100 percent of Rock Creek Bighorn Sheep winter/spring home range would receive a NSO stipulation. It is anticipated that this level of resource consideration would be sufficient to reduce or minimize adverse direct and indirect effects to bighorn sheep which use this management area.

Alternative 4: Via this alternative, the winter/spring home range used by the Rock Creek Bighorn Sheep herd would receive two types of stipulations. Approximately 95 percent would receive a NSO stipulation. The remaining 5 percent would have a TL stipulation applied. Under the terms of the lease, occupation of this area would be precluded from November 1 to July 1 each year.

It is anticipated that this level of resource protection is sufficient to reduce or minimize direct or indirect effects to the Rock Creek Bighorn Sheep and their required habitats within this management area.

Alternatives 4A: Selection of this alternative would treat the winter/spring range used by the Rock Creek Bighorn Sheep herd with three different levels of consideration. Approximately 45 percent of this seasonal home range would be administratively unavailable for leasing. An additional 50 percent of this area would be leased with a NSO stipulation. The remaining 5 percent of this seasonal home range would receive a TL stipulation. Under the terms of the lease, this portion of the Rock Creek Bighorn Sheep's winter/spring home range could not be occupied by oil and gas activities from November 1 to July 1 each year. Selection of this alternation would be anticipated to prevent or minimize direct and indirect effects to wildlife resources in this management area.

Alternative 5: Under this alternative, 5 percent of winter/spring home range utilized by the Rock Creek Bighorn Sheep herd would receive a NSO stipulation. The remaining 95 percent of this seasonal home range would receive a CSU stipulation. Under the terms of a CSU lease, operators would be required to screen the visual and audible impacts of a drilling project to the extent possible. This would not remove the disturbance from the home range, but would reduce the sphere of influence surrounding the activity. This type of stipulation affords little benefit to wildlife. At a minimum displacement from optimum to sub-optimum habitat would be anticipated.

Issue #3: Aesthetics (Map 2)

Alternative 2: The entire management area would be covered by no lease, so there would be no change in the visual quality.

Alternative 3: An NSO stipulation would be applied to the entire management area, so there would be no change in the visual quality.

Alternative 4: Approximately 95 percent of the management area would be covered by NSO stipulations for visual and other resource protection, including about 92 percent of the visual corridor in this management area that is adjacent to Rock Creek Management Area F. The remaining area would be leased with a CSU stipulation. Where occupancy occurs on this portion, the operator would be required to visually and audibly screen their presence as much as possible. There will be minimal effects on the views.

Alternative 4A: Approximately 55 percent of the management area would be administratively unavailable. An NSO stipulation would cover 40 percent of the management area. An TL stipulation would be applied to one percent and an TL/CSU stipulation would apply to the remaining four percent. Under this alternative there would be minimal effects on the views.

Alternative 5: About one percent of the management area, including the visual corridor around Rock Creek, would be covered by an NSO stipulation for riparian area protection. The remaining 99 percent would be leased with a CSU stipulation. Where occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Visual Corridors

Alternative 2: The ¼ mile visual corridor surrounding the boundary of Management Area F Rock Creek would be no lease.

Alternative 3: The ¼ mile visual corridor surrounding the boundary of Management Area F Rock Creek would receive an NSO stipulation.

Alternative 4: The ¼ mile visual corridor surrounding the boundary of Management Area F Rock Creek would receive three types of stipulations. An NSO stipulation would cover 85 percent of this visual corridor. An TL stipulation Hellroaring/Silver Run Elk winter/spring range would overlap on five percent of this visual corridor. This TL stipulation would not provide adequate protection during peak visitor season. The remaining five percent would receive an CSU stipulation where the operation would be required to visually and audibly screen there presence as much as possible.

Alternative 4A: The ¼ mile visual corridor surrounding the boundary of Management Area F Rock Creek would receive three types of stipulations. The visual corridor would be administratively unavailable for 65 percent of the area. An NSO stipulation would cover 30 percent of this visual corridor. The remaining five percent would receive an TL/CSU stipulation where the operation would be required to visually and audibly screen there presence as much as possible.

Alternative 5: The ¼ mile visual corridor surrounding the boundary of Management Area F Rock Creek would receive two types of stipulations. An NSO stipulation would cover five percent of this visual corridor. The remaining 95 percent of the visual corridor would receive an CSU stipulation where the operation would be required to visually and audibly screen there presence as much as possible.

Issue #4: Recreation (Map 6)

Trails

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the trail system.

Alternative 3: NSO stipulations would be applied to the entire management area for other resource protection, so there would be no effects on the trail system.

Alternative 4: Eighty percent of the trail system and its ¼ mile buffer would be covered by an NSO stipulation for protection of the visual quality. An TL stipulation from Rock Creek Bighorn Sheep winter/spring range would overlap on five percent of the trail buffer. This TL stipulation would not provide protection during peak visitor season. The remaining 10 percent would be covered by a CSU stipulation. Where occupancy occurs on this portion, the operator would be required to visually and audibly screen their presence as much as possible. There will be minimal impacts to trail users.

Alternative 4A: Approximately 70 percent of the trail buffer would be administratively unavailable. An NSO stipulation would apply to five percent of the trail. The remaining 15 percent would be covered by an TL/CSU stipulation.

Alternative 5: All of the trail system and its ¼ mile buffer would be covered by a CSU stipulation for protection of the visual quality. Where occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard from the trails, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Recreation River

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the recreation rivers.

Alternative 3: NSO stipulations would be applied to the entire management area for other resource protection, so there would be no effects on the Main and Lake Forks of Rock Creek.

Alternative 4: Approximately 75 percent of the recreation river corridor along the Main and Lake Forks of Rock Creek would be covered by NSO stipulations for other resource protection. About ten percent of this river corridor would be covered by a TL stipulation for elk summer range. Oil and gas activities would be restricted between June 1 and November 1 annually, which would cover a large portion of the heavy recreation use period. The remaining 15 percent would be covered by a CSU stipulation. Where occupancy occurs on this portion, the operator would be required to visually and audibly screen their presence as much as possible. There would be minimal impacts to recreationists along Rock Creek.

Alternative 4A: Approximately 60 percent of the recreation river would be administratively unavailable. An NSO stipulation would cover 30 percent of the recreation river. An TL stipulation would apply to five percent of the recreation river. The remaining five percent would cover the recreation river with an TL/CSU stipulation.

Alternative 5: Approximately five percent of this recreation river corridor would be covered by an NSO stipulation for riparian area protection. The remaining 95 percent would be covered by a CSU stipulation for protection of the visual quality. Where occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard from Rock Creek, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Organizational Camps/ Visitor Information Site

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on organizational camps or the visitor information site.

Alternative 3: NSO stipulations would be applied to the entire management area for other resource protection, so there would be no effects on organizational camps or the visitor information site.

Alternative 4-5: The organizational camps and the visitor information site would be covered by a CSU stipulation for protection of the visual quality. Where oil and gas occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard from these sites, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Alternative 4A: The organizational camps or visitor information site would be administratively unavailable.

Issue #6: Roadless (Map 2)

Alternative 2: The entire management area would be covered by no lease, so there would be no effect on the roadless area.

Alternative 3: NSO stipulations would be applied to the entire management area for roadless and other resource protection, so there would be no environmental effects.

Alternative 4: Approximately 90 percent of these roadless areas would be covered by NSO stipulations for other resource protection. An TL stipulation for Hellroaring/Silver Run Elk winter/spring range. This TL stipulation would not provide adequate protection during peak visitor season. The remaining five percent would be covered by a CSU stipulation for protection of the visual quality. Where occupancy occurs on this portion, the operator would be required to visually and audibly screen their presence as much as possible, but the roadless character of the area may be affected.

Alternative 4A: Under this alternative 60 percent of the roadless area would be administratively unavailable. An NSO stipulation would cover 30 percent of the roadless area. An TL stipulation would apply to five percent of the area and the remaining five percent would receive an TL/CSU stipulation.

Alternative 5: Less than five percent of the roadless area would be covered by an NSO stipulation for riparian area protection. The rest of the area would be covered by a CSU stipulation for protection of the visual quality. Where occupancy occurs on this portion, the operator would be required to visually and audibly screen their presence as much as possible, but the roadless character of the area would be affected.

4.2.9.2 MA T : GLACIER LAKE

Issue #1 Soils and Vegetation (Map 1)

Soils

Alternative 2: The entire management area would be no lease, so there would be no effects to fragile soils.

Alternatives 3-4A: The entire area would be leased with an NSO stipulation, so there would be no effects to fragile soils.

Alternative 5: About 55 percent of the fragile soils would be covered by an NSO stipulation for riparian area protection. There would be no effects to fragile soils on this area. The remaining 45 percent of fragile soils would be covered by a CSU Stipulation for retention of visual quality. Where oil and gas occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. However, reclamation would be more difficult and the potential for offsite sedimentation and water and wind erosion would be higher until reclamation is successful.

Riparian Areas

Alternative 2: The entire management area would be no lease, so there would be no effects to riparian areas.

Alternatives 3-5: An NSO stipulation would be applied to all riparian areas within the management area, so there would be no environmental effects.

Issue #3: Aesthetics (Map 2)

Alternative 2: The entire management area would be no lease, so there would be no change to the visual quality.

Alternatives 3-4A: The entire management area would be leased with an NSO stipulation for protection of fragile soils and partially for protection of visual quality. There would be no change in the visual quality.

Alternative 5: An NSO stipulation would be applied to about 55 percent of the management area for riparian area protection. The remaining 45 percent would be leased with a CSU stipulation. Where occupancy occurs, the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views would not appear greatly modified. Following reclamation, the views would again be predominantly natural appearing.

Issue #4: Recreation (Map 6)

Alternative 2: The entire management area would be no lease, so there would be no effects to the trail system.

Alternatives 3-4A: The entire management area would be leased with an NSO stipulation for protection of fragile soils, so there would be no effects on the trails in the area.

Alternative 5: Approximately 55 percent of the trail system and its ¼ mile buffer would be covered by an NSO stipulation for riparian area protection. There would no impact on trail users on this portions. About ten percent would be covered by a CSU stipulation, where the operator would be required to visually and audibly screen their presence as much as possible. Some oil and gas activity may be seen or heard, but views would not appear greatly modified. The remaining 35 percent would be leased with Standard Terms. Trail users would possibly hear and see oil and gas development activities as they hike this portion of the trail system. Use of the 200 meter offset and the 60 day delay would lessen possible disturbances. Following reclamation, the views would again be predominantly natural appearing.

CHAPTER 5

PUBLIC INVOLVEMENT SUMMARY

NOTE TO READER

The following section contains a summary of public comments received during scoping and the public comment period on the draft EIS. Immedialtely after the summary is a listing of public participation events and consultations with other agencies. The final document is a listing of repondents to the EIS.

A seperate appendix, H, is being prepared for the responses to Federal, State, and local agencies and elected officials. This appendix will be bound seperately and will be sent with the final EIS. Responses from the general public will be bound in another seperate appendix and will be maintained in the project record. It will be available on request to anyone asking for it.

The following page has a Table of Contents for the Public Involvement Summary to help the reader find specific areas of interest.

TABLE OF CONTENTS
Public Involvement Summary

SUBJECT	PAGE
5.0 INTRODUCTION	1
5.1 RESPONSE TO THE SCOPING DOCUMENT	1
5.2 RESPONSE DRAFT ENVIRONMENTAL IMPACT STATEMENT	4
5.2.1 OVERVIEW OF PUBLIC COMMENTS	5
5.2.2 ADEQUACY OF THE ANALYSIS (general)	
5.2.2.1 Stipulations; Mitigation Measures; Waivers, Exemptions, or Modifications; and Bonding	5
5.2.2.2 No Surface Occupancy and Timing Stipulations	5
5.2.2.3 Waivers, Exemptions, and Modifications	6
5.2.2.4 Use of Least Restrictive Stipulations	6
5.2.3 ADEQUACY OF THE ANALYSIS AND/OR ALTERNATIVES IN RESPONDING TO ISSUES	
5.2.3.1 Soils and Vegetation, including Threatened, Endangered, and Sensitive species	6
5.2.3.2 Fish and Wildlife Populations and Habitat, Including Threatened,Endangered, and Sensitive species	7
5.2.3.3 Water	9
5.2.3.4 Aesthetic Qualities	9
5.2.3.5 Recreation	9
5.2.3.6 Cultural Resources	10
5.2.3.7 Roadless Areas, Wilderness, Beartooth Scenic Byway, Wild and Scenic Rivers	10
5.2.3.8 Quality of Life, the Human Community, Health and Safety	11
5.2.3.9 Economics	11
5.2.3.10 Cumulative Effects Analysis	13
5.2.3.11 Issues/Sub-Issues Dismissed from the Analysis	13
5.2.4 ALTERNATIVES	
5.2.4.1 Range of Alternatives	14
5.2.4.2 Support for Various Alternatives	
Alternative 1	14
Alternative 2	16
Alternative 4	16
Alternative 5	16
Alternative A	16
Alternative B	16
5.2.4.3 Opposition to Various Alternatives	16
5.2.5 ADEQUACY OF THE DOCUMENT	
5.2.5.1 Text	16
5.2.5.2 Maps	18
5.2.6 REASONABLY FORESEEABLE DEVELOPMENT SCENARIO	18
5.2.7 ADEQUACY OF THE PLANNING PROCESS	20
5.2.8 ADEQUACY OF PUBLIC INVOLVEMENT	20
5.2.9 SUPPORT FOR OIL AND GAS LEASING IN THE BEARTOOTH MOUNTAINS (general)	20
5.2.10 OPPOSITION TO OIL AND GAS LEASING IN THE BEARTOOTH MOUNTAINS (general)	21
5.2.11 MISCELLANEOUS COMMENTS	23

CHAPTER FIVE

5.0 INTRODUCTION

Beartooth Mountains Oil and Gas Leasing Proposal - Background Information

The availability of mineral and energy resources within National Forest System lands affects the development, economic growth, and defense of the Nation. The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of mineral and energy resources on National Forest System lands to help meet the present and future needs of the Nation.

The Custer National Forest Land and Resource Management Plan and Record of Decision signed June 19, 1987, identified lands on the Forest that are administratively available for oil and gas leasing. This analysis will tier from the Forest Plan EIS and will address the environmental effects of leasing in the various management areas defined by the Forest Plan.

The area identified for study in this analysis approximately 183,000 non-wilderness acres within the administrative boundaries of the Beartooth Ranger District, in addition to other lands adjacent to the District. The analysis includes lands reaching from the Wyoming border to the boundary with the Gallatin National Forest north and west of the Meyers Creek Guard Station. Approximately 46,000 acres are currently leased within the study area.

The reasonably foreseeable development scenario (RFD) developed for the analysis and presented to the public in the "Scoping Information" package mailed to the public in late June 1991, predicts the reasonably foreseeable effects of post-leasing development activities. The RFD scenario is based on past oil and gas activity, geologic potential for oil and gas occurrence, potential for oil and gas development, and economics. The RFD is an analysis tool; it is used to predict potential impacts, and is a best estimate based on available information.

Issue Identification Process

Formal scoping began when the Notice of Intent was published in the Federal Register and a "Scoping Information" package was mailed to the public in late June of 1991. The following issues related to oil and gas leasing for the Beartooth Mountains Draft EIS were formulated through internal and external scoping efforts and submitted to the public for comment in the "Scoping Information" document:

1. The effects of leasing and subsequent oil and gas exploration and development activities on terrestrial habitat of plants and animals.

2. The effects of leasing and subsequent oil and gas exploration and development activities on local economies and social frameworks.

3. The effect of leasing and subsequent oil and gas exploration and development activities on the quality of the natural setting.

4. The effect of leasing and subsequent oil and gas exploration and development activities on water quality and aquatic habitat.

The "Scoping Information" package also described the proposed action and encouraged the public to participate in the development of issues and alternatives with the Forest Service. Three public meetings were held in July, 1991, in Billings, Columbus, and Red Lodge, Montana, to provide the public a chance to personally participate in the process.

The public requested the scoping period be extended to September 30 from July 31. The Forest Supervisor approved of this action in late July. Two open houses were held, one in Billings and one in Red Lodge, in September, 1991, to provide the public with an opportunity to ask Forest Service resource specialists questions about the project before the September 30 comment deadline.

5.1 RESPONSE TO THE SCOPING DOCUMENT

Statistical Analysis

Five hundred-seventeen individual written responses were received within the deadline for filing comments on this proposal. Of those, 456 were from individuals, 22 from organized groups, 11 from businesses, 6 from elected officials, 7 from State and other Federal agencies; 12 came as petitions; and 3 had no signatures. The majority of letters came from respondents who live relatively close to the project area; although, the proposal drew comments from respondents from 34 states and one Canadian province. In summary, the scope of respondents was as follows: 139 were from the "local" area (defined as Red Lodge, Cooke City, and surrounding communities), 271 were from the "regional" area (defined as the remainder of Montana, Wyoming, and Idaho), 81 were from the "national" area (the remainder of the United States), and 26 were from outside the United States, had no return address, or had multiple addresses.

Comments Regarding Effects of Leasing and Subsequent Oil and Gas Exploration and Development Activities on the Ecological Integrity of the Beartooth Mountains

Eighty-nine respondents opposed leasing and subsequent oil and gas exploration in the Beartooths because it is "one of the...ecologically most intact areas in the lower 48 states," "an important ecological Montana treasure," "one of the "great treasures of the State," and a "fragile natural system." One hundred twenty-five respondents expressed concerns about impacts of oil and gas leasing and subsequent exploration and development activities on wildlife habitat and populations. Some expressed specific concerns about impacts on threatened, endangered, and sensitive species, particularly the grizzly bear, bald eagle, and peregrine falcon. Seventy-nine respondents expressed concern for, or opposition to, oil and gas leasing and subsequent exploration and development based on concerns about the fragility of the area; loss or disturbance of sensitive, native plant species and other general types of vegetation; problems inherent in reclamation of disturbed areas; and introduction and spread of noxious weeds in this "pristine" environment. Sixty-five respondents expressed opposition to oil and gas leasing and subsequent exploration and development based on their concern for the quality and/or quantity of water as it relates to the ecological well-being of the Beartooth Mountains. Twenty-six respondents expressed concerns about air pollution in terms of impact on the ecology and ecosystem integrity of the Beartooth Mountains. Eight respondents expressed concerns about soil erosion resulting in sedimentation of streams and waterways and the possibility of landslides from slumping of unstable soils. Seven respondents (1 local, 6 regional) expressed concern about the potential for chemical or toxic spills which could have a lasting impact on the environment. Others expressed concerns about the potential for disturbing geyser activity in Yellowstone National Park, increasing potential for earthquakes, and increasing forest fire potential.

Comments Regarding the Effects of Leasing and Subsequent Oil and Gas Exploration and Development Activities on Local Economies, Social Frameworks, and Values

Sixty-two respondents expressed concerns about the impacts of leasing and subsequent oil and gas exploration and development to the human community that lives near and/or frequently visits this part of the Beartooth Mountain Range. Twenty-two respondents expressed concern about the safety aspects of oil and gas activities in relation to nearby community residents, travelers on the highway, and recreationists. Most prevalent in these concerns were comments about the deadly nature of hydrogen sulfide (H2) gas which, in the event of a blowout or leak, would threaten residents in areas that would be difficult or impossible to evacuate.

Sixty-eight respondents expressed concerns about the effects of oil and gas leasing, exploration and development on the economic base and business structure in the local and regional affected areas. Eighteen of these respondents supported leasing and subsequent development, primarily basing their support on the benefits that would accrue to the area and the affected counties as a direct result of an increase taxes paid by oil companies, increased jobs for the area's under-employed and unemployed population, and an increase in the population to share the tax load. Those who opposed oil and gas leasing and subsequent exploration and development activities did so primarily based on their stated opinion that the area was more important economically in its present state than it would be with development activities.

Sixty-seven respondents discussed their concerns about the effects of oil and gas development on the area's businesses and business structure. Most of these respondents opposed oil and gas development and expressed concern that the basis of that tourism is the outstanding scenic and recreation values of the Beartooth Mountains. Some respondents pointed out the economic importance of those residents who had been drawn to Red Lodge to pursue professional careers or entrepreneurial ventures because of the high quality of the environment. Others expressed concern that oil and gas development could detract from the area's real estate activity. Several respondents touted the compatibility of oil and gas development with tourism.

Seventeen respondents expressed their concerns about the changes that would be brought about in the social structure, the character of the local communities, and the additional demands that would be made on community infrastructure and services as a result of oil and gas leasing and development activities.

Comments Regarding Changes to the Naturally Appearing Landscape and Components of that Landscape

One hundred five respondents expressed opposition to leasing and development based on impacts to the whole of the experience of the Beartooth Mountains. These comments characterized the area as "unique virgin country," the "great outdoors," the "last, best place," the "last unspoiled frontier," the "most beautiful and intact area in the lower 48 states," one of the "country's last remaining treasures," "one of the jewels of the western United States," "the spectacular roof of Montana,", and a "national asset." Seventeen respondents expressed concern about the impacts of oil and gas leasing on the "spiritual" aspects of the "Beartooth experience." One hundred twenty-one respondents opposed oil and gas leasing based on impacts to the "visual wonder" and scenic qualities as they relate to the natural setting of the Beartooths. Forty-eight respondents opposed leasing due to impacts on the smell of, and visibility afforded by, "the clean, clear mountain air." Twenty-five respondents expressed opposition to oil and gas leasing and subsequent exploration and development based on concerns about "noise pollution." Five respondents expressed concern about additional traffic in terms of disrupting the natural setting and experience of the Beartooths. Forty-seven respondents opposed oil and gas leasing and subsequent exploration and development on the basis that the area should be left free of development for the benefit of future generations. Eighty respondents expressed their opposition to leasing and subsequent exploration and development based on the tradeoffs they perceived would occur if these lands were to be leased. Twenty-six respondents opposed oil and gas leasing and subsequent exploration and development based on potential loss of the tourism which depends on the natural setting in the Beartooth area.

Sixteen respondents expressed opposition to oil and gas leasing and subsequent development based on potential impacts to the Absaroka Beartooth Wilderness. Fifty-seven respondents opposed oil and gas leasing and subsequent exploration and development activities and facilities on the basis of potential impacts to the scenic values of local travel routes. Forty-five respondents expressed their objections to oil and gas leasing and subsequent exploration and development in specific areas of the Beartooth based on concerns about impacts to the scenic qualities and other components of the natural settings in these areas. The areas most often mentioned were the Silver Run area, the Rock Creek drainage, the Grizzly Peak area, Wild Bill Lake, Timbercrest Girl Scout Camp, the Line Creek Plateau, and the Beartooth Plateau. Eighty-two respondents expressed their opposition to oil and gas leasing and subsequent exploration and development activities based on the impacts of these activities on recreation settings, opportunities, and activities.

Twelve respondents expressed support for oil and gas leasing and subsequent exploration and development in the Beartooth Range, saying that there are sufficient regulations to ensure environmental protection of the area. Several respondents emphasized the possibilities of compatible coexistence of the semi-primitive recreation opportunities/recreation uses and oil development, and cited the benefits to the economy of such activities.

Comments Regarding Other Resources or Resource-Related Issues

Seventeen respondents expressed concern for protection of the archaeologically, historically, and culturally significant resources that have been and are yet to be located in the study area.

Seven respondents expressed concern that the oil and gas leasing in the Beartooth Mountains needs to be considered within the context of other development activities in the Greater Yellowstone Area.

Four respondents wrote in opposition to leasing of roadless lands at least until a wilderness bill is passed. Twenty respondents expressed comments supporting wilderness designation for a number of areas, such as Burnt Mountain, Timberline Creek, Beartooth Plateau, Line Creek Plateau, Limestone Butte-Arch Rock, Black Butte, Fishtail-Saddleback, North Absaroka, Red Lodge Creek, Hellroaring, and Woodbine. Four respondents pointed out that the area contained "many eligible Wild and Scenic Rivers."

Twenty-six respondents expressed concerns about the road network that would be necessary to transport waste materials, products, equipment, supplies, and personnel for the oil and gas exploration and development activities.

Thirteen respondents wrote about their concerns for maintaining public access to and within the Beartooth Mountains. Most were concerned that oil companies would be allowed to restrict their use of areas they have historically used for their recreation activities.

Several respondents expressed concern that the environmental analysis should include an issue on mineral resource management, since, "quite often when making this kind of decision only the impacts of oil and gas operation are considered.

A number of respondents expressed their opinions on the concept of multiple use. Some supported "responsible" oil and gas leasing and said that leasing is a legitimate part of the multiple use mandate that was set forth by Congress to the Forest Service for managing National Forest System lands. Others in this category favored "limiting" multiple use in some instances, because "it won't work in this case, as some uses are so destructive as to preclude use by the people."

Comments Regarding Process, Analysis, and Documentation

Two respondents expressed concern that the analysis should cover not only the Beartooth Mountains but the rest of the Custer National Forest, including those lands currently leased. One respondent concluded that "a second EIS on possible contiguous lands" will have to be conducted if currently leased lands were not to be included in the current EIS.

Seventy-nine respondents discussed their opinions about the need for oil and gas production from the Beartooth Mountains. Some respondents in both groups, those who opposed and those who supported leasing, expressed opposition to the use of the "reasonably foreseeable development scenario" (RFD). Eight respondents expressed concern with aspects of the scoping process.

Ten respondents requested that the analysis include an analysis of cumulative impacts.

Several respondents in this category cautioned that the environmental impact statement should consider a full range of alternatives. Some respondents suggested that it would be appropriate to consider a "worst case scenario" alternative.

Some respondents commented on the importance of attaching appropriate stipulations to leases to protect other resources values and to guarantee "restoration of sites to their original state." Several respondents expressed concern that using restrictive stipulations was inadequate to protect sensitive areas, and "should not be viewed as the 'cure-all' to protecting the area's resource values."

Several respondents expressed concern there was no "guarantee" that oil and gas companies will "abide by existing laws," and that current monitoring by the Forest Service is inadequate due to insufficient funding and personnel.

General Comments Regarding Support for or Opposition to Oil and Gas Leasing in the Beartooth Mountains

Thirteen respondents expressed support for oil and gas leasing in the Beartooth Mountains. Thirty-eight respondents expressed opposition to oil and gas leasing and subsequent exploration and development activities.

5.2 RESPONSE TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

Statistical Analysis

Five hundred and thirty-four individual written responses were considered in the analysis for written comments on the Draft Environmental Impact Statement. Of those, 483 were from individuals, 28 from organized groups, 12 from businesses, 3 from elected officials, 7 from State and other Federal agencies; and 1 had no signature. The scope of respondents was as follows: 38 were from the "local" area (defined as Red Lodge, Cooke City, and surrounding communities), 146 were from the "regional" area (defined as the remainder of Montana, Wyoming, and Idaho), 348 were from the "national" area (the remainder of the United States), and 2 were from outside the United States, had no return address, or had multiple addresses.

Organization of Comment Analysis Report

The following pages reflect the input received from the public during the scoping period. The comments summarized herein are presented in words taken as often as possible from respondents' letters. Quotation marks around phrases, whole sentences or groups of sentences reflect use of a respondent's actual words or wording. In some instances, one respondent's quoted words may be used to convey the ideas expressed by a number of respondents.

The comment summary has been organized roughly following the order in which the preliminary issues appeared in the "Scoping Information" package. Comments that pertained to other resource-oriented issues, analyses processes, pro- and anti-leasing, and miscellaneous comments are summarized after the preliminary issue comments.

5.2.1 OVERVIEW OF PUBLIC COMMENTS

Correspondence was analyzed both qualitatively and quantitatively. A quantitative analysis is not to be confused with a "vote count." Instead, it is used here to portray the interest and geography (who commented and where were they from) of the issues. While the data, in some instances, notes support or opposition relative to various facets of the proposal, a greater benefit is derived through attention to correlations, such as the amount of interest by issue area, agreement or disagreement between respondent types, and issue concern correlating to geographic location.

The following is a summary of the input received from the public during the comment period on the Draft Environmental Impact Statement. The comments summarized herein are presented in words taken as often as possible from respondents' letters. Quotation marks around phrases, whole sentences or groups of sentences reflect use of a respondent's actual words or wording. In some instances, one respondent's quoted words may be used to convey the ideas expressed by a number of respondents.

5.2.2 ADEQUACY OF THE ANALYSIS

5.2.2.1 STIPULATIONS; MITIGATION MEASURES; WAIVERS, EXEMPTIONS, OR MODIFICATIONS; AND BONDING

Thirty respondents (9 local, 14 regional, 7 national) commented generally and/or specifically about the adequacy, accuracy and sufficiency of the analysis in addressing the issues which had been raised by the public, or further discussed the issues themselves. A number of these respondents expressed concern that the analysis of potential impacts was inadequate and that stipulations and mitigation measures discussed in the DEIS would not "go far enough" or be successful in protecting resources they considered to be very important. One respondent expressed concern the effects disclosed in the DEIS represented a "worst case scenario," since the analysis failed "to integrate the various stipulations and types of mitigation measures employed to reduce or avoid adverse impacts to sensitive resource values."

5.2.2.2 NSO AND TIMING STIPULATIONS

Twenty-two respondents (12 local, 8 regional, 2 national) commented specifically on their concerns about application of No Surface Occupancy (NSO) stipulations. Some expressed concern about the adequacy of the DEIS in disclosing effects of oil and gas leasing, since roading of NSO-stipulated land was possible. Of particular concern to these respondents was the lack of a transportation system in the DEIS. They reasoned that roading increased access and human use of the area which would effect wildlife, wildlife habitat, sensitive areas and fragile soils, and said these impacts need to be addressed in the Final EIS.

A number of the respondents questioned the appropriateness of the NSO stipulation on large blocks of land where directional drilling could not be expected to reach the "core" of the areas. Some individuals questioned how areas surrounded by NSO would be accessed, and expressed concern the Forest is encouraging roading by surrounding parcels with stipulations that allow site occupancy with large blocks of NSO-stipulated land. One commentor said the DEIS overstates the availability of oil and gas reserves, "since the lessee cannot occupy the site nor reach the potential reserves by directional drilling methods," and suggested it would be more "realistic" to show those lands as "unavailable..."

Some suggested the NSO stipulation should be eliminated and replaced by the "no leasing" option where protection of sensitive surface resource values warrant the NSO stipulation. Respondents suggested this option be considered for all roadless areas; Silver Run; all trail, creek, and road corridors; all areas with important wildlife values (including Grizzly Management Situation 1 lands); alpine plateau areas, all areas with recreation values; and "the Line Creek Plateau Wilderness Study Area.

Some commentors expressed concern that NSO was inadequate for resource protection, since industry could apply for waivers, exemptions, and/or modifications of the NSO stipulation. Several commentors questioned the adequacy of the EIS in disclosing the effects of overlapping NSO stipulations, since "there is no indication which resource protection stipulation takes precedence...nor, does the DEIS indicate how the agency's decision to grant relief from a particular stipulation might affect another resource that was not directly protected by its own stipulation." One commentor suggested that "leases should clearly show all the resources for which the (NSO) stipulation is needed."

One commentor expressed concern that timing limitations were "limited in their ability to protect resources" because "these stipulations pertain only to the exploration of oil and gas and not the development or production phases."

5.2.2.3 WAIVERS, EXEMPTIONS, AND MODIFICATIONS

Several respondents commented on the subject of waivers, exemptions and modifications (WEMs) of lease stipulations. One commentor questioned what the process is to grant WEMS; several others were concerned that stipulations, particularly the NSO stipulation, were inadequate because WEMS are available and relief from stipulations "are often given after application for a waiver by the operator."

Several other commentors supported the language in the document regarding WEMS, stating that it is "important for the public to understand that in many cases the lessee can demonstrate that operations can be conducted without causing unacceptable impacts to surface resource values and that WEMS to a stipulation allow for needed management flexibility." They also said that it is "important for industry to know the conditions which must be met before WEMS to stipulations will be granted."

5.2.2.4 USE OF LEAST RESTRICTIVE STIPULATIONS

Three respondents commented (1 regional, 2 national) on the Forest Service's responsibility to use the least restrictive stipulations in granting leases. These commentors were concerned that the Forest Service fully justify "any restrictions on leasing or leasehold activities," and disagreed with the use of "widespread use of NSO stipulations." One respondent disagreed with the application of NSO stipulations on elk winter range, and stated that "normally this type of resource concern is handled with a timing stipulation." This same respondent expressed concern about the use of NSO in grizzly bear habitat (Management Situation 1 and 2) until the Forest Service completes formal consultation with the U.S. Fish and Wildlife Service. According to this respondent, oil companies have "experienced examples of the compatibility of oil and gas operations in grizzly bear habitat. The fact that habitat is critical to the grizzly bear does not mean that mitigation measures and timing restrictions would not provide adequate protection for the habitat and the bear."

Another respondent expressed concern about the NSO restriction for fragile soils, since 49 percent of the area is classed as having fragile soils or "mass failure hazard soils." According to this respondent the applicable goal, objective, and management standard establishes that the purpose of the 'fragile soil' NSO stipulation is to protect the quality of state waters. An NSO stipulation would be appropriate where the location of the fragile soil was such that its disturbance would cause a reduction in the quality of adjoining state waters. The DEIS sets forth three criteria for fragile soils and/or mass failure hazard soils. The second criterion dealing with the mass failure or loss of sediment into the streams appears to fit within the goals, objectives and management plan. The other two criteria are overly broad and exceed the requirements of the Forest Plan." This respondent urged the Forest Service to review all lands which have the NSO stipulation for fragile soils to ensure this stipulation "is necessary in all instances to protect state water and stated they would "assume" that other forest uses, such as timber, grazing, and motorized recreation that require occupancy of the land would not be allowed where the NSO stipulation was applied.

5.2.3 ADEQUACY OF ANALYSIS - ALTERNATIVES IN RESPONDING TO ISSUES

5.2.3.1 SOILS AND VEGETATION, INCLUDING THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Nineteen respondents (9 local, 8 regional, 2 national) made comments regarding the analysis of effects on soils and vegetation and/or the adequacy of the alternatives in responding to this issue. Several of these respondents expressed concerns about potential stream pollution and degradation of ground and surface water (particularly municipal watersheds) as a result of loss of vegetative cover, soil erosion and run-off from waste piles. Five respondents expressed concern the DEIS was inadequate in its "sensitivity for the alpine soils." One of these respondents cautioned that given the lack of knowledge about long-term effects of various alpine reclamation, the ability of alpine vegetation to recover, alpine soil recovery, and the physiological and ecological character of most native alpine species, " no leasing should occur in any alpine areas. This is an irreversible and irretrievable commitment of resources with absolutely no analysis or understanding of potential impacts." Other comments on this topic addressed the difficulty of re-vegetating alpine soils and the introduction of weed seed via roading.

Four respondents expressed concern that the effects of exploration and development of National Forest lands adjacent to the "Meeteetse Spires Preserve and Critical Area of Concern" was not adequately addressed. One respondent stated, " The area from Gold Creek three miles north to the 'Black and White' trail and a mile deep should be analyzed. If the analysis indicates that supportive protection is required, then proper stipulations should be placed on those leases" to protect the "unique scenic quality."

Two commentors expressed concern that the DEIS failed to consider threatened and endangered species and unique plant communities.

One respondent stated the DEIS failed to recognize the impacts to the "sensitive and tundra-like high mountain areas" such as the Line Creek Plateau, "the largest dry tundra area in the lower 48 states." This respondent said this is "an incredibly valuable natural area," and being unique, "its destruction should be unthinkable."

5.2.3.2 FISH AND WILDLIFE POPULATIONS AND HABITAT, INCLUDING THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Thirty-four respondents (7 local, 21 regional, 6 national) cited concerns about the adequacy of the analysis and the alternatives in responding to wildlife issues. Some of these respondents expressed concern about the "speculative conclusions" drawn about the impacts to wildlife; others were concerned with what they perceived to be "little attention" paid to wildlife values of the area and "how areas would be protected for the species involved."

Several respondents indicated that some alternatives and/or mitigation measures "did not go far enough" in protecting wildlife habitat. Of these respondents, some addressed the need to better analyze habitats, to determine whether or not critical wildlife and fish needs were being protected. In the case of fisheries, one respondent suggested characterizing and displaying aquatic resources "on no larger than a third order river basin," and providing a summary which would include the "name of water eddies comprising third order basins, length of size of water bodies, stream order, state assigned beneficial use of water body, whether the water body is currently meeting standards and its beneficial use, presence of any threatened and endangered species or species of special concern, and any existing stresses on streams," and "indicate whether the stream has particular importance as a spawning or nursery area."

Respondents expressing interest in fisheries effects were also concerned with "water quality, stream sedimentation, and increased public access to previously isolated fish populations."

Some respondents expressed concern that oil and gas leasing would have unacceptable impacts on big game herds and their habitats. One respondent was particularly concerned about the lack of discussion about the impacts to big game herds that have ranges overlapping the Montana-Wyoming border, particularly on the Line Creek Plateau and, to a lesser extent, in the Cooke City area. This respondent stated that the Clark's Fork elk, Beartooth Mountain goat, Clark's Fork bighorn sheep, Clark's Fork moose, and Clark's Fork mule deer have substantial movements across the border. The shared herds and/or game range are important to both states." This respondent also disagreed with the statement that "animals associated with Bennett Creek in Wyoming no longer use the the same 'core' winter/spring range as the animals that use Line Creek/Robinson Draw" (DEIS, page 3-140). This respondent stated, "few elk winter in the Bennett Creek area, but in late winter or early spring, elk that have migrated into Montana from Wyoming in early winter migrate southward from Montana into the Bennett Creek/Little Rocky Creek on their way back to the Line Creek Plateau. From 30 to 40 percent of the Clark's Fork bighorn sheep herd winters in Montana and summers in Wyoming. Recent studies have also shown frequent seasonal movements of mountain goats between Montana and Wyoming. The statement (page 3-16) that 40 goats use portions of Line Creek Plateau in both Montana and Wyoming is a low estimate. Recent studies in Wyoming indicate that 50-60 goats use Upper Bennett Creek/Line Creek. Also, 40-50 of the goats wintering in Wyoming along Clark's Fork Canyon migrate northward in the vicinity of West Summit and Gardner Lake to summer in Montana." One respondent was concerned that "Yellowstone (Park) needs a large buffer zone surrounding it for the welfare of many species which must range outside the Park to survive."

Some respondents cited concerns about the impacts of increased road densities, human and motor vehicle access, noise pollution, and hunting pressure, along with cumulative impacts of encroaching subdivisions, in threatening the integrity of "sizeable populations" of elk, mountain goats, deer, and bighorn sheep. They questioned the adequacy of the EIS in disclosing the impacts to summer and winter ranges, elk birthing areas, foraging zones, migration corridors, moose habitat and "critical habitats for other species of concern such as marten, wolverine, mountain lion, pronghorn antelope, and black bear. One respondent expressed concern that "taxpayers" had just paid "a few million for the Waples land for elk habitat and mitigation," so that "you can lease to oil drillings." One respondent stated, "because of the lack of cover and long sight distances, the potential that oil and gas exploration or development will displace or disturb big game on Line Creek is very high. Various studies have shown bighorn sheep and mountain goats are particularly sensitive to such activities. A recent research project in Alberta (Canada) demonstrated that goats experience stress during oil and gas exploration and documented range abandonment by goats in some cases."

Another respondent expressed concern about the displacement of bears. This respondent said, "Bears who live in this territory will be disturbed and may be driven down into Timbercrest Camp and other areas frequented most by humans, setting up a conflict between wildlife and humans - a conflict in which the animals lose most often."

Eighteen respondents (2 local, 10 regional, 6 national) expressed concern about impacts to threatened, endangered and sensitive species, including the grey wolf, Townsend's big-eared bat, spotted and pallid bats, harlequin ducks, bald eagle, peregrine falcon, Yellowstone cutthroat trout, and, most often, the grizzly bear. One respondent also commented about the possible existence of the rubber boa snake in the Beartooth Mountains. Most of these respondents indicated that more priority should have been given to the habitat needs of these species. Some said there should be no leases in critical habitats for these species; others suggested investigations that should be conducted to determine possible effects to various species. Others said that since the information in the DEIS suggested sensitive species were not well identified or understood, it would be better to wait and make leasing decisions after data becomes available. One respondent suggested, "because reintroduction of a viable population of wolves to Yellowstone is becoming a likely reality, habitat zones in the Beartooth Mountains should be identified and secured from any oil and gas leasing. This respondent also suggested that "much of the possible bat habitat has not been investigated because the area where these species would occur is largely unsurveyed. Much of the lower elevations of the entire study area may contain the pallid bat, and the limestone palisades area of the Line Creek Plateau should be thoroughly investigated to see how much any oil and gas exploration development would effect these habitats." The same respondent also stated that "the remaining (harlequin) duck habitat in the study area should be left intact and road removal should be looked at as an option for the recovery of habitat," since "any further development of road for the use by oil and gas exploration would only further diminish duck habitat if roads were to parallel stream or river valleys.

Several respondents were concerned about the loss of grizzly bear habitat and the potential loss of the grizzly from the Greater Yellowstone area since, "any decrease in habitat of the grizzly will severely jeopardize this species' battle from extinction." Some commented on the need for the analysis to consider cumulative effects, such as the effects of the Crown Butte planned operation in the Upper Stillwater, to the grizzly. Others commented on the loss of recovery potential for the bears. One respondent quoted recent research as showing "a minimum viable population of grizzly bears is between 1,670 and 2,000 animals" and that "over 15 million acres of undisturbed habitat is required, more than all of the identified recovery zones for bears." This respondent suggested that since "it can be assumed that all of the roadless area of the Beartooth Mountains should be considered for bear recovery zones, any oil and gas exploration in or near grizzly habitat would constitute a possible violation of the Endangered Species Act." Another respondent pointed out the Forest Service would be "in danger of violating their Forest Plan in at least two instances with the upcoming decision. First, the Forest Plan clearly states, 'Grizzly Bear Management Situation 1 areas are not to be leased for oil and gas and will be considered for mineral withdrawal (p. 17). Only Alternative 2 in the Draft EIS is consistent with this standard. Second, the Forest Plan states, any road proposed in occupied grizzly bear habitat will be evaluated through a cumulative effects analysis for grizzly bears (p.51). A 'No Surface Occupancy' stipulation would not prohibit associated road construction."

One respondent urged that the Final EIS include "the Forest Service biological evaluation of the effects of the various alternatives on grizzly bears and other species listed under the Endangered Species Act." This respondent was concerned that the Draft "omits grizzly bears in the 'Threatened and Endangered Species' section of Chapter 4" and suggested that the statement "no direct or indirect effects to grizzly bears or their habitat would be anticipated," gives "insufficient information for the public to respond to, and perhaps more important, fails to provide the decision-maker with information that is fundamental to choosing a preferred alternative."

5.2.3.3 WATER

Seven respondents expressed concern about the assessment of impacts to water quality, the possibility that impacts will occur, and the mitigation measures being applied to lessen/avoid impacts to water quality. Several of these respondents said that "mitigation cannot avert the damage to water"; others expressed concern that roads across streams would be difficult, if not impossible, to reclaim. One respondent called the disclosure of water resources and impacts to those resources "woefully inadequate," stating that "since actual streamflow data for any stream seems unreasonable, at a minimum estimated streamflows and water quality samples for each stream on Forest Service lands should be indicated. This monumental task can be achieved by giving priority to the high and moderate oil and gas potential areas as is planned for the cultural resources inventory work. This provides a baseline from which to analyze impacts, such as spills, to surface waters. There is no baseline information at all nor mention of any plans to obtain this information." This respondent also asked how the Forest could "objectively evaluate surface water impacts without having baseline information to compare with it."

One respondent also commented on the adequacy of the analysis in assessing ground water impacts. This person wrote, "Ground water flow paths are readily identified on larger scales through fracture trace analyses and drainage patterns from topographic maps and aerial photographs. These large scale flow paths are the primary flow structures and, as such, do not need to be located with intensive dye trace testing and monitoring wells. At least 60,000 gallons of water are necessary for mud make-up for a 10,000' well (not including other water needs at the site). Such water withdrawals do impact the short-term storage capabilities of a localized area and contribute to a decline in stream baseflow. This respondent suggested, "if industry anticipates such water uses and mud losses, then the RFD scenario should likewise address those issues."

5.2.3.4 AESTHETIC QUALITIES

Eight respondents (3 local, 3 regional, 2 national) commented about the adequacy of the alternatives in being sensitive to the aesthetic qualities of the Beartooth region. One asked for clarification as to what "partial retention" means, in terms of what impacts would be seen from the highway and what "not to exceed modification" means. Another respondent took issue with the premise that the Lions Camp was obtrusive in terms of impacting the "awe-inspiring grandeur" of the Beartooths. This respondent commented that "to minimize the effects of intrusion (by oil and gas exploration and development) in this area by labeling it already 'heavily altered' requires unimaginable mental contortion."

5.2.3.5 RECREATION

Twenty-seven (12 local, 12 regional, 3 national origin) respondents commented on the recreational issue. Of those respondents who commented on the recreation issue, most were concerned that the DEIS did not adequately address the "economically valuable winter recreation activities." One respondent wrote, "the DEIS discussion on the affected environment (Chapter 3) must be revised to include better details on recreational use, including trends. Winter recreation is absolutely ignored throughout this document, not only in Chapter 3, but in the environmental consequences section as well." Another respondent said, "although some discussion occurs regarding the Red Lodge ski area, little evaluation is present regarding the heavily used cross-country ski areas at Silver Run and Lake Fork."

Many respondents on this issue were concerned about changes oil and gas exploration and development may make in the recreation settings. Some asked that a buffer zone, from one-half to one mile wide, be utilized to maintain a "quality outdoor experience.." One respondent said the buffer zones in the DEIS would be insufficient "to protect Forest users from the lethal effects of hydrogen sulfide gas or sour gas. Timing stipulations do not work to protect recreationalists from sour gas. Timing stipulations are only in effect during exploration and do not apply to development and production phases of a well." Another respondent pointed out that timing restrictions would provide insufficient protection for winter recreation in areas like Silver Run, Rock Creek, and the West Fork of Rock Creek (which) receive extensive winter use, and said the DEIS failed to analyze the impacts of oil and gas activities on these uses.

Other respondents expressed concerns about the adequacy of the analysis in focusing on the "traditional recreational and educational uses at each specific site," and the impacts on recreation activities such as mountain biking, hiking, and camping. One respondent asked that the Forest consider that "this area has an unmeasurable amount of value in a pristine state. People don't travel to Montana to see oil wells and roads on the 'most scenic highway in the United States.'"

Some of these respondents expressed concern that the DEIS failed to consider impacts of oil and gas exploration and development on the tourism-based local communities. For example, one respondent asked, "how many tourists will no longer want to travel through Cooke City or other corridors along the Beartooth Mountains or stop in the local communities and spend their money. How many guide services and recreational dollars will be lost due to oil and gas exploration and development. The need for roaded recreation was found to be adequate in the Front Range counties of Montana for the next century; are the needs for roaded recreation already met in the Beartooth Mountain region and will increased roads from oil and gas exploration and development only diminish roadless recreation activities which are growing steadily at 5 percent per year."

5.2.3.6 CULTURAL RESOURCES

Four respondents wrote about their concerns with the cultural analysis for the study. One suggested that, "greater effort should be put into a literature review and research for the Sheepeater Shoshoni," and asked if any "traditional records" had been found that connect the Arikara with the area. Another respondent expressed concern with the lack of investigation of sites. This respondent cited the EIS in discussing a "very high density of archaeological and historic sites," of which many qualify for "protection under the 1966 National Historic Preservation Act," and suggested the Final EIS "must investigate areas for any and all archaeological sites before any further project can be undertaken." This respondent went on to say, "A large number of these sites may be valuable to further understanding of our American prehistory. There are no doubts that many Native American historic sites exist within the decision area and these should be carefully examined before any leasing decisions are made. Under the Archaeological Resource Act, subsurface activity must be investigated and surveyed before a project can be undertaken. All oil and gas exploration, road building, and earth intrusion activities qualify as subsurface." The third respondent reminded that the eligibility for historic site status needs to be preserved for "three sites listed in the 'National Register.'"

5.2.3.7 ROADLESS AREAS, WILDERNESS, BEARTOOTH SCENIC BYWAY, WILD AND SCENIC RIVERS

Twenty respondents (6 local, 5 regional, 9 national) expressed concern about the adequacy of the analysis to assess the impacts to roadless and wilderness values or the adequacy of the alternatives to address the issue of maintaining roadless and wilderness values in the Beartooth Mountains. Some of these respondents emphasized the importance of roadless lands and wilderness, and the "largest wild alpine environment", and said the tradeoffs of these values for questionable oil and gas resource returns was "a grievous disservice to the public trust." Some said the analysis failed to take into account the "importance of roadless and wilderness lands...from a local perspective, as well as regional and national perspectives." Others expressed concern that protection for these values in the alternatives was inadequate, and oil and gas development would compromise the chances that potential wilderness in this area would receive classification. One respondent said the RFD sites were too close to the established Absaroka Beartooth Wilderness and "threatens the integrity of the basic wilderness theory..." Some respondents cautioned the Forest to delay decisions and lease development until Congress establishes a Montana Wilderness Bill, since a number of these areas have been considered in prior legislation.

One respondent pointed out the economic dependence of local communities on maintaining the "richness and diversity of wildlands and wildlife" in this area. This respondent said, "To reduce the integrity of this ecosystem is to further damage one of the last vestiges of wild areas in the country. The value of such wild areas far outweighs the value of any oil and gas development. The local communities of the Beartooth Mountains will be headed for a disaster if oil and gas development diminishes any of the natural environmental qualities unique to the area. As the population of the country increases and the demand of tourism and recreational use in the last wild places increases, so will the value of these wild areas. Because oil and gas reserves exist in areas of the country that are not of significant wilderness or wildland value, do not have extreme costs associated, and where probability of a significant find is more likely, it would be a gross mistake to allow any oil and gas exploration in the Beartooth Mountain region."

Four respondents were concerned the alternatives did not adequately address the importance of the Beartooth Scenic Byway, and said that visual impacts of roading in this area are in conflict with the purpose for which the Byway is designated.

One respondent expressed concern that some of the alternatives considered in the EIS would not adequately protect the eligibility of local riverways for Wild and Scenic River designation. The areas of concern to this respondent include the Stillwater River, the West Fork of Rock Creek and East Rosebud Creek, which "have all been found eligible for Wild and Scenic River designation." The respondent suggested that the Final EIS "acknowledge the Wild and Scenic designation and provide adequate protection for the one-half mile wide corridor which must be protected around these streams," and that these areas not be leased "unless it is economically feasible to directional drill into the site, in which case a NSO stipulation would be acceptable."

5.2.3.8 QUALITY OF LIFE, THE HUMAN COMMUNITY, HEALTH AND SAFETY

Twenty-five respondents (6 local, 14 regional, 5 national) expressed their views about the adequacy of the analysis, the alternatives, and the Forest Service's concern for maintaining the quality of life for those who live near, recreate in, or come to the Beartooths. Some discussed their concerns about keeping the area "as it is" and as they grew up with it for future generations to enjoy, and said there was inadequate attention paid to the "real" benefits of the Beartooths, including the visual and aesthetic qualities, which "draw tourism and recreation activity and dollars to the local communities." One respondent suggested the Forest Service "ask people whether they think the aesthetic and visual qualities of the area would be damaged by oil and gas development, and whether they would be willing to have this type of activity in their backyards." This respondent also suggested the Forest ask "the local communities, tourists, and recreationalists, what they would be willing to accept as compensation (in dollar terms) for the devaluation of the aesthetic and visual qualities in the area." This respondent stated that "by figuring out the value of such an area to the people who use and live in the area, the Custer National Forest can evaluate whether oil and gas exploration and development makes any economic sense compared to the aesthetic valuation given to the area by the people. Non-traditional valuation must be taken into account in the decision process. Option, bequest, and existence values are vital to the valuation of a wild area. People like to know the wild areas exist and like to know that they will exist forever wild leaving them for their children and future generations." This respondent also said, "The preservation of a wild place does not remove its potential in the future as a source of valuable resources. Oil and gas may still be extractable in the future through slant drilling and more environmentally sensitive techniques."

Some respondents were disappointed the EIS did not give more consideration to the areas in which they lived and indicated they would have to move should oil and gas development happen near them. Some cited concerns about devaluation of property should development occur; others said that oil and gas development would change not only their living environment, but their feeling of "well being" in the area. One respondent suggested the analysis needed to acknowledge that Management Areas R and T in the Red Lodge area were "being strongly affected by subdivision of lands within and adjacent to the National Forest."

Some said they were concerned about safety aspects of oil and gas exploration and development. Some were worried about the increase in traffic and the hazards associated with the heavy truck traffic in the area and felt these impacts were not well enough identified in the EIS. One respondent stated that "there will be no modification of the State/Federal highway system through the Beartooths without approval of the Montana Department of Transportation." Another was concerned about the impacts of heavy vehicles on "light duty paved and gravelled roads" and bridges "rated at less than twenty-ton capacity." One respondent expressed concern that the issue of potential impacts to county roads and bridges was not adequately addressed, that Roads and bridges needed to access the areas being considered for oil and gas should be described in the document, and that the "potential impacts to county roads and bridges (should be) evaluated in Chapter 4..."

Others were concerned about oil and hazard waste spills and leaks, air pollution, and waste disposal, and said the EIS did not adequately assess these impacts, the success in mitigating these impacts, or the costs - economic and ecological - associated with them.

5.2.3.9 ECONOMICS

Thirty-three respondents (13 local, 11 regional, 9 national) cited concerns with the disclosure of economic effects and/or the analysis of economic considerations in the Draft EIS. A number of these respondents expressed general concerns that the analysis did not adequately consider the local, regional, and national values of the Beartooth's recreation, aesthetic qualities, wildlife, and wilderness, and its tourism industry. Some respondents were particularly concerned the values of winter recreation and the local ski area had been "ignored" in the Draft EIS.

While several respondents acknowledged the area had some mineral values, most were concerned that the "priceless" amenity values "far exceed any short-term monetary gains" from mineral exploration and development. One respondent felt that oil and and gas leasing in the Beartooth Mountains could not be reduced to an economic decision "following the erroneous 'jobs versus environment' argument."

A number of these respondents were particularly concerned the Draft EIS overlooked or minimized the regional and national attraction to these lands, and the benefits of tourism to the "local" economy. According to one respondent, the Draft EIS "does not fairly examine the potential harmful effects on the Beartooth Front's presently most viable industry: tourism and recreation." Another said that oil and gas leasing, exploration and development "would mean the loss of jobs, small businesses and capital" in the area. In emphasizing the national significance of the area, one commentor said, "One of Montana's biggest assets in world economic competition is its scenery."

There was concern among some of these respondents about the short-term nature of oil and gas revenues to the area's communities, about hiring of locals versus non-locals, and about the community's economic stability as affected by oil and gas versus it's current recreation/amenity-base. According to one respondent, "The idea that oil and gas exploration and development contributes to local economic growth and stability is a long standing myth in much of the Rocky Mountain region. While oil and gas can contribute to the economy of an area, it is ridiculous to assume that the area's economy is based upon extractive industry. The economic base model used by most business economists and local chamber of commerce institutions only takes into account income dollars that are gained from extractive industry, manufacturing, and government income sources. However, most tourism, recreation, and increasing goods and services industries actually in most cases have a more positive contribution to the local community than increasing reliance on extractive industries such as gas and oil development. By recirculating income dollars in the local community and letting less dollars flow out of the local community, a local economy increases its level of self-reliance and increases the 'multiplier' effect. In many cases, the development of oil and gas along the Rock Mountain Front area has had a negligible or negative affect on the local economy. The oil and gas industry is also at the whim of rising and falling market prices. There is no control of what goes on outside of the area. In order to develop the area for exploration, costs including road building, housing, rigging, environmental controls, pollution damage, loss in tourism, and all other costs need to be looked at. Before even looking at the overall costs to the pristine environment of the Beartooth Mountain Region, there must be an analysis of whether the costs of development will be greater than the cost of the probable level of discovery." This respondent also stated, "To claim that oil and gas exploration is a long-term and beneficial economic activity to the local counties is wrong. The combination of boom and bust cycles due to changing oil prices, the relatively low probability of oil and gas in most of the areas proposed for leasing, and the extremely high costs associated with development in this area, lead the local communities down the road to gloom and doom future associated with oil and gas reliance."

Some respondents in this category were concerned with the cost benefit analysis. One respondent wrote, "Why is it that the value of the mineral and forest product resources of our public lands can be evaluated to precise market values while the depletion of the resource itself or the destruction of the regeneration potential of the land and damage to other resources such as watershed or wildlife doesn't enter into the debit side of the valuation. True market valuation of such an operation must account for all debits as well as the credits. To do otherwise is misleading to say the least and wouldn't be tolerated by any corporation in the United states. The argument that many of the other values such as groundwater impact or the bio-diversity reserves of an area are too difficult to assess for comparison to commercial/industrial uses is a case of blind sided management practices and a short fall in current land management policy."

Several of these respondents said the Draft EIS did not provide an adequate cost benefit comparison for the alternatives. One respondent, who had previously "suggested approaches to the determination of economic impacts of the various alternatives," stated the Draft EIS "merely lists the results of quantitative manipulation of out-dated data," and concluded the document "does not contain the analysis of economic impacts required to choose among the alternatives." Another respondent suggested that the Final EIS provide a "valuation of the expected oil and gas uses in comparison to alternatives including energy efficiency" and said, "the values are "quantifiable, well documented, and highly relevant." This respondent also suggested the Final EIS should document "how much oil and gas is expected from the Beartooths in comparison to the US current daily needs and the size of other less costly alternatives; and how much

Beartooth oil and gas will cost in comparison to other less costly alternatives.

5.2.3.10 CUMULATIVE EFFECTS

Twenty-four respondents (5 local, 11 regional, 8 national) expressed concern about cumulative impacts to the Beartooth Mountains and the cumulative impacts analysis. Of these, 5 respondents stated concerns about the cumulative impacts to the Yellowstone ecosystem, in that "each new development ... taken cumulatively, provides for future disaster to the integrity to that ecosystem." Several of these respondents said that the cumulative analysis failed to recognize the Yellowstone and the "unique niche of the Beartooth area" within that ecosystem.

Some respondents asked that the Final EIS reflect a more "detailed discussion" of cumulative impacts that addresses the "effects of the reasonably foreseeable (oil and gas) development of the various alternatives with other ongoing and reasonable foreseeable activity in the area." Some were particularly concerned about cumulative impacts of the mining operations in the Stillwater drainage, the East Boulder, and around Cooke City, and subdivision of private property adjacent to the analysis area. Others also cited concerns about timber, hard rock claims, and grazing. They stated that oil and gas might be the "straw that breaks the camel's back" in terms of adding to impacts on such things as critical wildlife habitat.

Some respondents were concerned the discussion of cumulative effects was "weak" and "erroneously assumes that cumulative impacts are the same for all alternatives." They said "the analysis should be corrected to reflect the different impacts associated with each alternative, which will certainly change depending on the leasing restrictions established."

One respondent urged that the cumulative impact analysis "integrate all the identified stipulation and mitigation measures prescribed by the Forest Service to protect Forest resources so the public will have a better sense of how oil and gas operations are actually conducted," and said these activities "are compatible with sensitive resources."

Another respondent urged that the Final EIS "should emphasize concern over the predictive assessment and the monitoring of cumulative impacts," and this concern should include "all past, present and reasonably foreseeable actions including, but not limited to, forestry practices, grazing, and oil and gas development." This respondent was concerned that "full consideration of these cumulative impacts" needed to be "carried forward to lease offering or approval of an APD."

5.2.3.11 ISSUES AND SUB-ISSUES DISMISSED FROM ANALYSIS

Sixty-nine respondents (6 Local, 22 Regional, 41 National origin) commented on issues/sub-issues that were dismissed as a result of the scoping process, because they were beyond the scope of this analysis.

Several of the respondents stated "We must conserve energy and push for alternative energy sources" and "we need to put our time and resources into researching and developing alternate means of energy". Many of the respondents gave suggestions for renewable sources of energy, "wind power, solar power, recycling of natural resources". A few suggested using "more fuel efficient cars or electrical cars". "As long as we as a nation continue to cater and dance to the demands of big oil, we will never cut the umbilical cord to our insatiable appetite for big oil, ours, or someone else's, alternatives will never be developed." Many respondents stated "this country does not have an adequate energy policy" and some requested that the Forest Service "place a moratorium on all oil and gas leasing of public lands" until a viable energy policy is in place.

One of the respondents suggested having this DEIS be reviewed by the new President and his advisors who were "more environmentally sensitive". Several other respondents voiced very similar sentiments.

Four respondents made comments about the reclamation and bond issue. "Bonds or cash reserves can be posted to cover the cost of monitoring and policing the recovery," was one statement. Another commented, "Bonding be set at a sufficient level to cover all legitimate government costs associated with reclaiming oil developments."

Two respondents supported Montana's congressional delegation's proposal for Wilderness designation on the Beartooth's and one "urged the Forest Service to work with this delegation for the Wilderness designation".

Solid waste disposal and toxic or hazardous materials was a concern for two respondents.

Eleven respondents (6 Local, 5 Regional origin) expressed their concern that the that the DEIS did not adequately discuss full field development. One respondent stated, "The public needs to know exactly what leasing and subsequent development means to the area. The end result of oil and gas leasing must be included in the DEIS."

5.2.4 ALTERNATIVES

5.2.4.1 RANGE OF ALTERNATIVES

There were three respondents that stated concerns about the adequacy of range of Alternatives. One Local respondent stated "the detailed information seemed to be secondary to the text in all alternatives which were used for the evaluation of the impact of the leasing on the Beartooths". A Regional respondent expressed the concern, "The alternatives failed to adequately reflect the public input received during the scoping process." The National respondent wanted alternatives added to reflect "no leasing" or "leasing" on a case-by-case basis.

5.2.4.2 SUPPORT FOR VARIOUS ALTERNATIVES

Alternative One

Three hundred and fifty respondents (4 Local, 79 Regional, 265 National, and 2 unidentified origin) expressed support for Alternative One (No Leasing).

Displayed below are the percentages (of comments) and a sampling of the reasons given for supporting the "no Leasing" Alternative.

Percent	Reason Example(s) of comments.
22%	No reason given. "I urge you to acknowledge the real worth of the Beartooths by adopting the "No Leasing" alternative." "I want to remember this area as I have seen it and know that it will remain that way. I believe the only alternative is the "No Leasing" alternative, #1." "I am outraged that the Forest Service would consider destroying the Beartooth Mountains for oil and gas development, and I fully support the "No Leasing" alternative."
4%	Soils and/or vegetation. "...any opening of the Custer National Forest for exploration or development of oil or natural gas would put the vegetation, rivers and watersheds at too great of a risk." "All of this area is fragile with a very shallow soil-vegetation cover, much of the land is on highly angled slopes." "Absolutely no leasing should be allowed in this area because of its importance to rare plant species."
9%	Fish, wildlife, biological uniqueness, biodiversity "These mountains are unique in wildlife and contain some 62,000 acres of big game winter ranges." "Drilling as proposed for oil and gas will destroy the Beartooth Front and its biodiversity." "My concerns center around adverse impacts on endangered species (the grizzly bear)." "The grizzly bear is particularly sensitive to habitat fragmentation due to human intrusion. The venue for human intrusion adverse to wildlife is almost entirely by the construction of roads."
19%	Aesthetic Values: sight, sound, smell, Montana's "last best place." "Montana is considered by many to be the "last best place" left in the U.S., let us in Montana be far sighted enough to protect our natural assets from the short term material gains sought by big business." ...there is no need to degrade such a magnificent national treasure from greed and short term profit." "This area is one of the most beautiful treasures of the world in its primitive state, freshness and animal habitat." "...the natural beauty must be preserved for the generations ahead." "The regions scenic beauty demands that the entire area be protected from the destruction of oil and gas drilling." "The Beartooth Highway is one of, if not the most beautiful drives in America."
7%	Recreation "Continued world population growth will in the future place increasing pressures on those areas reserved for recreation. We can afford to lose none of those remaining." "Recreation should be the priority use of the Beartooth Mountains." "If the Beartooth Range were leased for oil and gas development it would be

ruined as a premier camping and backpacking destination.

"I know the Beartooth region for its priceless recreational values."

"...this whole area is too important for recreation to even consider further development."

10% Roadless and/or Wilderness.

"...their (Beartooths) value as wilderness areas and remnants of a once wild America far exceed any value that they may have for timber, gas and oil and other exploitable natural resources."

"Three areas of the Beartooths are currently being proposed for wilderness designation by Montana's Congressional delegation."

"...this no lease should also include the Line Creek Plateau Wilderness Study area."

"There are so few natural lands that have been untouched by human hands."

"Oil and gas searches invariably lead to more roads and other impacts of exploration, not to mention those brought by any subsequent resource development."

6% Quality of Life.

"For the unimpared enjoyment of future generations, I urge you to adopt the no-leasing alternative."

"Our children's and grand-children's enduring natural heritage is infinitely more important than extremely short term and time limited economic benefits. The National Forest is not the exclusive property of the local communities and does not belong at all to the oil and gas companies."

"We have destroyed so much in our lifetime that was important and should have been passed on to our children and grand-children..."

9% Economic issues including oil and gas resources.

"Short-term local economic gains are not answer to the long-range survival of this pristine area."

"The long range financial gains will come through preservation, not exploration."

"No matter how many new jobs are produced or amount of money made, the damage done to the Custer National Forest would be too great and irreversible for any development to occur."

"Consider the views of the thousands of hikers, tourists, hunters and those that enjoy the beauty and serenity of the Beartooth Mountains. These people will return to Montana and spend their money provided that there are reasons for them to come back."

"We most surely don't want to sacrifice the Beartooths to oil company development for a boom-bust cycle for a local economy."

4% Access, roading, specific areas to be made "No leasing" or "unavailable" instead of "No Surface Occupancy" based on opposition to roading of these areas.

"Access should be for people to enjoy in their own way, without new roads or restriction by industry of public use."

"Human access is highly detrimental to top predators and other sensitive species, and despite our best efforts at mitigation, roaded access is harmful to soils, vegetation and water quality."

"I specifically urge the no leasing option for Rock Creek, West Fork of Rock Creek, northern part of Line Creek Plateau and Cooke City."

"The Forest Plan should not be amended to allow leasing or drilling in areas that are presently designated as no surface occupancy (NSO)."

"Because roads are allowed under the "No Surface Occupancy" rules, we support the "No Leasing" option, rather than the NSO."

10% Greater Yellowstone Ecosystem.

"The Beartooths are an integral part of the Greater Yellowstone Ecosystem."

"The "No Leasing" alternative is the only acceptable alternative if we are to continue to protect the integrity of the extraordinary Greater Yellowstone Ecosystem."

"We urge you to abandon development plans for the Beartooths and other ecologically critical areas of the Greater Yellowstone Ecosystem. This bioregion is not only an American treasure, but a global one, and demands increased protection, not increased development."

"The long range benefit of preserving the Greater Yellowstone Ecosystem is infinitely greater than short term monetary gains for the local economy."

"The lands adjacent to Yellowstone Park are essential to the Park ecosystem."

Alternative Two

Eleven respondents (7 Local, 4 Regional origin) support Alternative Two.

There were several respondents that supported this alternative because of no lease designation of Rock Creek and West Fork of Rock Creek, Line Creek and Cooke City. One respondent commented that this alternative would protect the municipal watershed of Red Lodge. Several respondents asked for further no lease designations; all roadless areas, Line Creek Plateau Wilderness Study Area, all developed recreation sites (with 1/2 mile buffer zone).

Alternative Four

One Regional respondent preferred this alternative "as it would make only 24% of the lands available for any type of leasehold activity."

Alternative Five

Five respondents (2 Regional, 3 National origin) preferred this alternative. Some of their reasons for support include: "I think Alt. 5 is the only one that would give the oil and gas leasing companies any reasonable feeling of security after they apply for the lease and are granted one." "We believe this option will give the Forest Service the flexibility in land management decisions while staying within the parameters of environmental protection and will allow the industry to develop the minerals." "This alternative provides the Forest Service with options for multiple use in the area. With the 36 CFR Regulations covering oil and gas, the Forest Service can manage the Beartooth resources, which include oil and gas leasing and development."

Alternative A

Two respondents (1 Local, 1 Regional origin) supported this alternative because "all lands not available".

Alternative B

One National respondent supported this alternative. "It is vitally important that oil and gas leasing be resumed without further delays in this high potential area."

5.2.4.3 OPPOSITION TO VARIOUS ALTERNATIVES

One National respondent opposed Alternative One specifically. Two National respondents opposed Alternative Two specifically. Two National respondents opposed Alternative Three specifically. Thirty-two respondents (12 Local, 16 Regional, 4 National origin) expressed opposition to Alternative Four.

Several respondents expressed their concerns about the numbers of acres available with Alternative Four. Other expressed concern that Alternative Four failed to protect wildlife. Three respondents based their concerns on recreation values. One respondent stated that cultural values would be impacted. Three respondents expressed concern about impacts upon roadless and Wilderness areas if Alternative Four were to be chosen as the preferred Alternative.

5.2.5 ADEQUACY OF THE DOCUMENT

5.2.5.1 TEXT

Thirty-two respondents (14 local, 14 regional, 4 national) expressed concern about the adequacy of the Draft EIS; some commented generally about the quality of the document, saying it was "hard to understand and follow," "poorly organized," "confusing," used extensive "jargon-ese," and contained numerous "minor mistakes."

Some pointed out errors, for example, instances where numbers in tables did not add and where information did not "coincide." For example, one respondent pointed out a case in which an acreage total in a table was "8,880 acres more than the stated 177,100 acres of NFS lands in the area" and asked that, "you...clarify this discrepancy." Another respondent said the data in Table 4.4, for elk "do not add up." Others pointed out "errors and omissions in the text," such as "Chapter 3 points out that Red Lodge gets its water from wells," when "it gets most of its water directly from the West Fork of Rock Creek just downstream from the Forest." Others pointed out errors in the Management Area descriptions, such as "the reference to a road in Management Area 'D' Line Creek Should be dropped. The old maps reference a two-track jeep trail from US 212 to the north end of the Plateau. The Forest closed that area long ago."

Some respondents were concerned that the document was "certainly not 'user friendly," and that "attempts to 'promote a holistic approach to the oil and gas leasing process'" were thwarted by present information by individual management areas. According to one respondent, "this makes it difficult to piece together potential impacts to streams, water quality, and fisheries, which exceed boundaries of individual management areas." One respondent commented, "analysis and disclosure by Management Area provides a disjointed view of what effects could occur. These areas are geographically wide spread. Our members are familiar with the area on the basis of drainages or big game herd areas. They lose continuity when they must move back and forth through the discussion to determine the potential effects for any specific area of interest. The MA approach does little to tie together what is occurring in adjacent MA's. Discussion of the effects by logical geographic areas would provide a more readily understandable disclosure." Another respondent said the discussion should be presented in a "breakdown by user interest," would be more meaningful than the 'MA' approach, since "reviewers could readily focus their attention on areas of interest and readily see what is projected." This respondent suggested the following groupings: Line Creek, Rock Creek, Rosebud/Red Lodge Creek, Fishtail, Stillwater Complex, and Lodgepole/Bad Canyon.

Some respondents were concerned that the document, while it had "a lot details," was not site-specific. According to one of these respondents, "(while) your use of analysis and disclosure by 'management areas' probably meets the requirements for regulations, ...I don't believe it meets the intent." Another of these respondents suggested that "the selected approach, to discuss consequences without reference to any particular location, fails to deal with the issues of interest to us."

One respondent expressed concern the Draft EIS "does not provide an acceptable analysis on a project level basis" or "sufficient information to fully assess environmental impacts that should be avoided". Additionally, this respondent said the document "lacks information concerning monitoring requirements for protection of aquatic, terrestrial, and air resources."

A number of respondents said the Draft EIS should be revised or the Final EIS strengthened to address the the following "deficiencies" of data, analyses, and/or disclosure:

Add specific instructions as to how the 1985 Seismic EA direction will be included in the leases. "Does this mean that the mitigation measures stipulated in that document will be incorporated into all helicopter supported exploration and development programs?"

Include "cross-references" in the glossary, displaying the initials and acronyms used in the EIS, or provide "a separate listing of abbreviations and what they stand for."

Provide "a much more detailed disclosure than is presented in the text" for using this analysis "to promote a holistic approach to the oil and gas leasing process and to thereby avoid the piece-meal effects that could result from analysis on a lease-by-lease basis."

State the long-term environmental benefits and risks for all proposed alternatives.

Evaluate the availability and leasing decisions within a broader regional and national perspective.

Acknowledge the differences between a "no lease" decision and a decision to lease with "No Surface Occupancy" stipulations.

Identify potential impacts from leasing with NSO stipulations.

Provide a more substantive discussion in Chapter 4 on the different impacts among various leasing options.

Explain priorities for overlapping NSO stipulations

Disclose potential field development impacts based on the RFD scenario.

Provide more substantive discussions and evaluations of recreational use, roadless and wilderness area values, wildlife populations and habitats, and economic values and impacts.

Provide corrected cumulative effects analyses.

Clearly state at what stages public participation will take place on the Application for Permit to Drill.

Provide, in summary form, an inventory of resources from which subsequent site-specific analyses can be readily tiered for project-level analyses.

While several respondents suggested the EIS be redrafted, one said, "None of the changes recommended herein are of such significance to require a redraft under NEPA, but making such changes would significantly improve the document."

One respondent expressed concern the document contained an "obvious....pro-leasing attitude." Several others said the "push" to meet a deadline for publication of the Draft EIS to meet the national schedule had "undermined the entire NEPA process" and resulted in a poor quality document. According to one of these respondents, "it does not matter how quickly this EIS is done--it matters only how well!!!"

5.2.5.2 MAPS

Twenty-three respondents (15 local, 7 regional, 1 national) expressed concern about the quality of the maps in the Draft EIS. Many said the maps were "vague," "difficult to decipher," "not detailed enough," or provided no reference to physical landmarks, such as drainages, towns, roads, or riparian areas, or facilities. Some respondents commented that the map bases were out-of-date and showed antiquated names and places that no longer exist. Two respondents pointed out that "Robinson Draw" in the Line Creek "C" Management Area should be "Robertson Draw." Another commented, "the Silver Run Ski Trail is shown as a road." Some respondents commented the map scales were so small "the meaning of the legends are lost"; others commented they were confused that legends were inconsistent between maps.

Some respondents commented specifically on the alternative maps, saying these maps were "too small a scale" and too devoid of detail to provide an understanding of the "various leasing and stipulation options by alternative" or "what is happening on adjacent management areas." Some of these respondents said that the "deficiencies" in the maps made it impossible for them to comment on the various leasing options by alternative.

Some respondents expressed concern and confusion with the management area maps which lacked reference points and detail. For example, one respondent said, "the maps...are not identified as being site specific and are of very little value to anyone who does not have an overall map to coordinate the interior maps. The maps appear to be a series of rectangles with absolutely no relation to natural fixtures or man-made aspects of the area. I have hiked, fished, and hunted the immediate area for twelve years and I was unable to determine where some of the maps fit into the terrain." These respondents were confused by the configurations of the various maps, and could not ascertain "where the maps would fit into the overall scheme of the proposed leasing area with the exception of the small notation indicating which direction is north."

Suggestions from respondents for improving the maps included:

- Overlay new road locations, well sites, storage facilities on various resource maps, such as streams and riparian areas, fragile soils, sensitive fish and wildlife species' ranges, and ongoing or other potential activities (timber, grazing, etc.) to allow the reviewer to easily decipher potential impacts.
- Provide maps in Appendix E to identify areas proposed for lease notices and various lease stipulations.
- Make map legends, complete, consistent and readable.
- Show topographic features on base maps to help orient readers.
- Use up-to-date base maps.
- Use larger scale maps, particularly for the alternatives to better show the difference between various leasing and stipulation options.
- Provide management area maps showing leasing options by alternative.

Some respondents suggested that maps be improved and re-issued, and that additional time for review be granted, since their ability to comment meaningfully on the alternatives was hampered by the inadequacies in the maps.

5.2.6 REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

Thirty respondents (13 local, 12 regional, 5 national) commented that the Forest "failed to analyze the future effects of exploration and development" that will follow development. In a comment typical of this category, one respondent explained, "The reasonably foreseeable development scenario (RFD) identifies four hypothetical well sites, but then assumes that none will result in development, so the DEIS does not provide the impact analysis required by law and regulation."

Some of these respondents also expressed concern that impacts of production were not analyzed, based on the assumption that statistics on the success rate of "rank wildcat" wells did not support production on a scenario of four wells. Others were concerned that some of the well sites could not be be occupied because of various stipulations. Several respondents expressed concern the Lake Fork Creek well site was not analyzed more thoroughly. For example, one respondent said, "The DEIS states that one of the four sites, Lake Fork Rock Creek would be covered by NSO, so it does not analyze any potential impacts from siting. This type of reasoning makes the RFD analysis meaningless." Another questioned the value of the analysis of sites that "are not truly available for occupancy," since a lessee "does not have unlimited opportunities for moving out of the decision area if he cannot occupy the site." One respondent cautioned, "To be truly available leases granted must be accessible under current technology. This means a lessee must have reasonable access to a location where drilling is permitted". This EIS has a 15-year applicability period. Within that context, land made available for leasing by this EIS must be accessible under current technology."

While some respondents were agreeable with the basic assumptions of the RFD, there was objection to the site-specific siting of wells. According to these respondents, "predictability of where oil and gas resources are located, or where industry will place their exploration and development investment, is highly speculative. Each lease granted must be viewed as having the potential to produce gas or oil. No prudent person would lease a property to explore for oil or gas unless they felt there was a chance of recouping their investment at a profit." Another respondent who disagreed with "the Forest Service's decision to pinpoint four exact well locations with accompanying roads" called it "unwise," since "this information is not useful to anyone, except perhaps the Forest Service but even then it is only marginally useful for purposes of analyzing potential effects." This respondent argued, "Public disclosure of Forest Service projected well sites and road locations should be strictly avoided because such projections are pure speculation and are, therefore, totally unreliable. Their inclusion in the decision documents will only serve to confuse the general public. Moreover, it must be made clear that industry is not limited to those projected well locations; that their intended purpose is for analyzing potential effects only. We believe the Forest Service runs a significant risk in identifying well sites that may not be the selected sites of the leaseholder. Such speculation is misleading and may cause significant problems for the Forest Service when a company chooses an alternative site than those analyzed in this document." This respondent also suggested "...the Forest Service should delete all references to and discussions about the specific well names and road locations. The four examples should be retained, but should be renamed... The maps of each well site, the photos, and the discussions specific to each well site should be deleted entirely, leaving only the more general discussion of what normally occurs with oil and gas operations." Another respondent said that specific siting of wells would lead to "unnecessary changes in the project level analysis." Another respondent suggested that the EIS "show the locations as possible places where oil wells could be located that would have minimum impact in the area."

One the other side of this discussion were respondents who were concerned the RFD did not provide enough site-specific information to allow the public "to evaluate the likely development on the leasehold interest." For example, one respondent suggested the EIS include the following information for each site:

> "a. Dean Dome: The access route crosses almost a mile of private land. the road to be reconstructed is a two track jeep road for most of its length and will require nearly the same disturbance as new construction. There are private residences close to the planned location.
>
> b. West Fork Rock Creek: There is a subdivision just north of the Forest Boundary. The area is used for dispersed recreation. It is part of a grazing allotment, and there is a modest timber harvest program using the same transportation system...
>
> c. Silver Run Creek: Will FS #71 and the bridge withstand the heavy truck traffic? The asphalt is very thin. A few years ago, FW&P's expressed concern regarding winter snowmobile activity in this drainage. The Silver Run Ski Trail, which enjoys a particularly high use is not mentioned. The West Fork drainage is actively being sub-divided. Water from Silver Run Creek is used by the City of Red Lodge for its water. Chapter three points out that Red Lodge gets its water from wells. Actually, it gets most of its water directly from the West Fork of Rock Creek just downstream from the Forest. Thus, a high concern for activity at this site, is valid."

This respondent and others also expressed concern about how the information disclosed in the RFD scenario is to be used "in determining whether or not places such as the Red Lodge City Watershed, the high alpine plateau areas of Line Creek and Silver Run, and Red Lodge Mountain Ski area should be leased." Several respondents said the RFD was "misleading" in that it leads the public into "thinking that only a small area will be affected during the next 15 years." Another suggested that it would be "easier to consider only oil and gas development at the four well sites", since "it occurs to us that it is really premature to open up more than these four sites for leasing."

Some respondents were concerned with the "statistical reliability" of the statement that "commercial/ economic production is not reasonably foreseeable at this time."

A number of respondents were concerned that the RFD did not have a transportation plan for oil and gas exploration and development, thus, there was an inadequate disclosure of the full impact of this action. Some expressed concern about the additional amount of traffic on existing roads; others were concerned about heavy loads on low-standard roads and bridges; still others were concerned about the roads that would have to be built to accommodate this activity. One respondent, who supported oil and gas activity, challenged the assumption of "8 acres of disturbance per one mile of single land road," (Table B-2), and said, "this is far in excess of what normally occurs. We believe the Forest Service intended to say .8 acres, since this corresponds more closely to current disturbance standards."

One respondent asked that further explanation be provided for the statement "deviation from the RFD scenario intensity...may require additional NEPA analysis before authorization of leasing." This respondent expressed concern that "the deviation from the RFD scenario will not occur until after leasing."

5.2.7 ADEQUACY OF THE PLANNING PROCESS

Five respondents (1 local, 2 regional, 2 national) commented on the adequacy of the planning process. One expressed only general concern; another supported the decisions "to prepare an oil and gas leasing analysis and decision document for the entire Beartooth Ranger District," and the "decision to make both the lands availability decision and the specific lands decision..." in this process. One respondent commented that the "preferred alternative...does not meet the goals set in the Forest Plan"; another expressed concern that the Forest Service failed to "explicitly choose a 'preferred alternative' which provides industry with a convenient benchmark for comparison purposes." One respondent was concerned that the 15-year scope should be extended "to reflect a realistic timetable of possible longterm development, production and eventual reclamation," since "fifteen years is arbitrarily short and is improperly based on a prophecy that exploration activity on these lands will be insignificant and generally fruitless."

5.2.8 ADEQUACY OF PUBLIC INVOLVEMENT

Twenty-seven respondents (21 Local, 5 Regional, 1 National) requested an extension of thirty days to six months for additional review time and more public input for the DEIS. Most of these respondents requested additional public meetings for Forest Service personnel to clarify the DEIS contents. Some of the respondents requested a revised DEIS with more adequate maps.

Twelve respondents (5 Local, 7 Regional) expressed their concern that the Forest Service appeared to be ignoring previous public input. Several stated more consideration should be given the publics disapproval of oil and gas exploration in the Beartooths. Some stated disappointment at the Forest Service's decision of choosing Alternative Four as the preferred alternative after the public's input at the scoping level. One said "the final version should either be vastly expanded to more closely reflect the concern of local citizens, or it should be completely withdrawn and the process should begin from scratch."

5.2.9 SUPPORT FOR OIL AND GAS LEASING IN THE BEARTOOTH MOUNTAINS

There were fifteen respondents (11 Regional, 4 National) that expressed support for oil and gas leasing in the Beartooth Mountains.

A brief overview of support statements included: "As our nation is now looking to foreign nations for over one-half of our energy needs, we must look wherever reasonably possible for future energy sources." "Do not let a long term decision like denying leasing in the Beartooths, due to lack of interest, take place because of the current industry position of "no interest" based partly upon previous Federal land management practices." "I have first hand experience in the type of job the industry can do to protect and preserve a fragile environment." "This country desperately needs its natural resources, as our current national economic conditions demonstrate, and we all know how incredibly desperate Montana needs the income, tax revenue and the jobs that successful exploration and drilling operations would bring." "We believe it is vitally important that the Forest Service continue to recognize oil and gas activities as a legitimate multiple use of public lands." "It is my feeling that those opposed to oil and gas exploration are not aware of modern exploration techniques that the industry now employs." One respondent concluded, "you indicate in the DEIS your purpose is to encourage exploration, development and production of oil and gas resources while adequately protecting all resource uses in the analysis area. ...Your recommendations and approach are inconsistent with this stated purpose and will actually discourage companies from drilling for oil and gas on National Forest system lands. Increasingly, energy companies are shifting capital overseas where opportunities for exploration and development of oil and gas resources are more accessible."

5.2.10 OPPOSITION TO OIL AND GAS LEASING

Three hundred and forty-one respondents (18 Local, 80 Regional, 241 National, 2 unidentified origin) expressed opposition to oil and gas leasing and subsequent exploration and development activities.

The following percentages and categories represent the total comments (not total respondents) expressing opposition of oil and gas activities.

Percent	Concern Example(s) of comments.
21%	Opposed without a given reason. "I'm against this unwarranted leasing of public land to be destroyed by the gas & oil drilling." "I feel that the Beartooths need to be protected from all oil an gas development." "Please say no to the oil and gas companies. Think first of the environment." "I am appalled by the idea of leasing the 99% of the roughly 177,000 acres in Custer National Forest for oil and gas exploration."
5%	Soils and/or vegetation. "The oil industry would foul up adjacent streams and land just by their presence." "The Beartooths contain the largest expanse of alpine tundra outside of Alaska in the U.S., and geologic traits that illustrates its uniqueness." "I don't think any leasing or development should be allowed in this area due to its unique fragile plant and soil condition."
8%	Fish and/or wildlife including biological uniqueness and biodiversity. "I oppose leasing key grizzly bear habitat for gas and oil drilling to disrupt and destroy a wilderness that is an excellent habitat for many creatures and all wildlife habitats." "To jeopardize 10 big-game winter ranges anywhere in the lower 48 is certainly too big a price to pay for a minuscule amount of gas and oil." "I ask that the following areas be made unavailable for leasing: The grizzly management lands near Cooke City."
19%	Aesthetic values including sight and smell. Also the respondents perceptions of the Beartooths being the "last best place", "a national treasure", and "scenic." "The Beartooth Mountains are a public treasure for all Americans." "Save that gorgeous area for generations to come. Why can't you adopt the principle 'Is this good for my great great grandchildren?' when you are deciding about leasing? Keep Montana the last best place." "You will destroy these picturesque mountains." "The Beartooths priceless values and scenic beauty demands that the entire area be protected from the ravages of oil and gas development." "I am also deeply opposed to widespread leasing because of the effects that such leasing has on water

and air, including the noise and potential pollution."

5% Recreation.

"It is important that several other areas be designated no leasing: All recreational areas including a large 'buffer' zone."

"We thoroughly enjoyed the rugged, wild nature of this area. Truly the wildest place we've backpacked. I'm appalled that you are considering opening up portions of this area to oil and gas development."

"Recreation is getting to be in shorter supply than fuels."

10% Roadless and/or Wilderness.

"The fact is that Montana's Congressional delegation is backing wilderness designation for a significant segment of the front."

"These lands are unique and deserve to be preserved as Wilderness sites."

"There are too few places that one can find untouched wilderness and peace."

"I would even like to see more of the mountains designated official Wilderness areas, think of the long-term impact on this area."

"The following area should be designated no lease: All roadless areas and the Line Creek Plateau wilderness study area."

5% Quality of Life

"We need lots of clean places on earth wherein we can escape the increasing filth."

"These mountains should be kept as a precious heritage for future generations."

"Among my most pleasurable memories are those spent in the Beartooth region of Custer National Forest."

10% Economic issues including oil and gas resources.

"This is a short-sighted, short-term profit oriented plan with benefit to few."

"Neither the Forest Service not the Federal Government will ultimately profit very much from the development as compares with the oil companies."

"Any short-term monetary gains made for the local economy would be far outweighed by the loss in recreational and wildlife value."

"The local economy would be much better served in the long-term by promoting tourism vs. mining."

3% Roads, general ecosystem, specific management areas and areas with blanket NSO's.

"I strongly oppose any development in the Beartooth area and East and West Rosebud areas."

"I do not want to see the additional roads, I do not want to see the destruction of land through over use of off-the-road vehicles, I do not want to see the debris left behind by oil exploration and exploitation."

"I feel the following areas should be unavailable for leasing and designated no lease: 1) All roadless areas, especially the Line Creek Plateau Wilderness study area as proposed by Representative Pat Williams in 1992 Congress. 2) All critical wildlife habitat, especially grizzly bear Management Situation 1 lands near Cooke City. 3) All developed recreation sites and trails, including at least one mile buffer zone to avoid possible impacts to recreational users and resources."

"The following areas should be designated no lease: Large areas of NSO tracts which cannot be reached by direct drilling."

15% Greater Yellowstone Ecosystem.

"This area is an integral part of the Greater Yellowstone Ecosystem and must be protected from all oil and gas development."

"Such actions as the one proposed in the Forest Service's draft plan will destroy the integrity of the Greater Yellowstone Ecosystem."

"We can't allow the Forest Service to hand over to the oil industry,

piece by piece, the extraordinary Greater Yellowstone Ecosystem."
"Once you damage such a delicate ecosystem, one cannot mend it."
"This ecosystem is a treasure that must be preserved for the benefit of all Americans, including those of future generations."

2% Forest Service stewardship.
"It would be an incredible environmental tragedy and a monumental travesty of public land stewardship, if this region is opened to massive oil and gas development."
"The Forest Service should be obligated to protect all America's interests in our public lands and responsible for the stewardship of America's natural resources for future generations."

5.2.11 MISCELLANEOUS COMMENTS

There were seventeen comments that were not included in other designated categories.

Several respondents expressed concern about the Forest Service directing time and money to an oil and gas EIS and/or exploration and development contrary to public sentiment and when other programs and resources on the Forest were suffering as a result.

One respondent's concern was stated "I think the cards are stacked against oil, mining and logging to begin with and the environmentalist seems to have taken over."

Some respondents wanted assurance that the Custer National Forest, Gallatin National Forest, Shoshone National Forest and Yellowstone National Park were coordinating any oil and gas activities.

One respondent suggested that "multiple use policy is being re-defined," and suggested the Forest Service has "the opportunity and responsibility to move with this current, rather than try to block the tide with outmoded perspectives. It is only a matter of time before these changes are implemented as law and Federal policy."

Public Participation And Consultation With Other Agencies

Following is a summary of public information related activities related to the Beartooth Mountains Oil and Gas Leasing EIS development. Following the summary of activities is a summary of responses received from the public, organizations, and agencies.

Public Participation

Notice of Intent	06/27/91
Public Notice - Scoping	
Letter to Potential Interested Parties	06/28/91
News Release	07/01/91
Montana Open House Meetings	
Columbus, MT	07/08/91
Red Lodge, MT	07/09/91
Billings, MT	07/10/91
Letter from Interdisplinary Team Decision to extend Scoping Period to 9/30/91	07/26/91
Northern Plains Resource Commission	07/91
Stillwater Protective Association	07/91
Montana Open House Meetings	
Red Lodge, MT	09/12/91
Billings, MT	09/17/91
Meeting with Sierra Club	09/17/91
RFD Consultation with Industry	10/91
Discussions with RMOGA	10/91
Meeting with Line Creek Protective Assoc.	11/21/91
Carbon County Commissioners	11/21/91
Stillwater County Commissioners	11/21/91
Survey of master mail list for interest in Beartooth EIS (from participants of public meetings and respondents to public scoping	01/92
Meeting with Greater Yellowstone Coalition, Line Creek Protecttive Association, Montana Wildlife Federation.	02/13/92
Scoping Summary to all interested parties	02/21/92
Draft EIS to Public	09/23/92
Public Comment Period for Draft	09/23/92 to 11/23/92

Final EIS to Public	April 1993

Consultation With Other Agencies

Bureau of Land Management-Montana State Office Billings, Montana Geologic and technical coordination RFD Consultation	06/91 & ongoing
Montana Fish, Wildlife & Parks Billings, Montana	06/91 & ongoing
Crow Tribe Cultural Committee Chairman Facilities Manager of Tribal Council	12/91 & ongoing
Shoshone National Forest EIS Interdisplinary Team Cody, Wyoming	12/91 & ongoing
Northern Cheyenne Tribe Chairman of Tribal Cultrual Protective Board Assistant Research Professor, Dull Knife Memorial College	01/92 & ongoing
US Fish and Wildlife Service TES discussions	1/21/92 & ongoing

LISTING OF RESPONDENTS

AGENCIES AND PUBLIC OFFICIALS

County of Santa Cruz (121)
Stillwater County (428)
Wyoming Fish and Game (446)
Montana State Highway Department (5)
U.S. Environmental Protection Agency (515)
U.S. Department of Interior (556)
Montana Fish, Wildlife and Parks (554)
Red Lodge Chamber of Commerce (289)
Maryland Department of Natural Resources (491)

OIL AND GAS INDUSTRY RELATED BUSINESSES

ARCO Oil and Gas Company (445)
Cenex Company (448)
Marathon Oil Company (524)
Rocky Mountain Oil and Gas (422)
Texaco USA (452)
Hauptman Oil and Gas Producer (247)
Hancock Enterprises (292)

ORGANIZATIONS

Stillwater Protective Agency (425)
Wild Forever (460)
Wilderness Society (427)
Greater Yellowstone Coalition (288)
Greater Yellowstone Coalition (32)
Yellowstone Valley-Audubon Society (303)
Alliance for Wild Rockies (421)
Alliance for Wild Rockies (108)
Alliance for Wild Rockies (202)
Montana Historical Society (14)
American Fisheries Society (279)
Sierra Club - Denver (496)
Sierra Club - New Jersey (528)
Sierra Club - Billings (449)
Sierra Club - Maryland (353)
Sierra Club - Wyoming (356)
Sierra Club - New York (512)
Sierra Club - Colorado (502)
Sierra Club - Mass. (266)
Sierra Club - Montana (293)
Sierra Club - Ohio (365)
Sierra Club - Virginia (444)
Genesis Club (03)
Line Creek Protective Assoc. (286)
Line Creek Plateau Protective Assoc. (426)
Treasure Trails Girl Scouts (453)
Committee of Wilderness Supporters (414)

INDIVIDUALS

Abernathy, Mark
Adams, Charles
Adamson, Stuart
Aeusley, Cheryl
Albus, Jean
Alexander, Michelle
Allochis, Parmela
Amstutz, Judy
Anderson, Richard D.
Andreasen, Linda
Angel, Donna
Arp, Jane E.
Arslaw, Norman
Ash, Rod
Awner, Adela
Bair, Dorothy
Baird, Dennis
Baker, David
Baker, John
Ball, Gene
Ballard, Tom
Bardwell-Jones, Rachel
Barker, Georgia
Barker, Yovonne
Bass, Rick
Bauer, Erwin & Peggy
Bay, Marcene
Beauchamp, David T.
Beers, John E.
Beiando, Joseph
Bellmyer, Vicki
Bennett, Thomas
Betz, Richard
Bialas, Micheal
Blair, Jan
Blake, John
Blasenstein, Elise
Cloom, Roseanne C.
Bloomer, Jerry
Blumenberg, Thomas L.
Boeschen, Arthur
Booker, Sam
Booth, Elizabeth Anne
Bordenkircher, Dave
Bore, Bill
Bowersox, Carrie S.
Boyle, Joseph L.
Bradford, Ann
Brakenahl, Roberta
Bridges, George & Olive
Bross, John R.
Broussard, Phillip
Brown, James
Buckley, John
Budge, William
Burdorf, Donald L.
Burgess, Olivia A.
Busch, Jean
Busch, Thomas
Butz, Michael R.
Campbell, Elizabeth
Campbell, Karen E.
Campbell, Louis s.
Campbell, Virginia
Capra, Stephen
Card, John B.
Case, Ausanne
Castagnori, Kay
Chamberlin, W. Dennis
Chaplick, John M.
Cherry, Donna R.
Christen, Peter J.
Christie, Richard
Christman, Thom
Clark, Jim & Mary Jo
Clayton, John S.
Kadous, Jim
Cochrone, Stephanie
Confer, Clarissa
Confer, John
Conner, James
Cook, Adele
Coomer, Grant
Coppersmith, Paul
Corey, Robert
Cortori, Renee
Cowan, Judy
Crawford, Bill
Cretelli, Nancy
Crum, Robert
Cunningham, Kirk
Cuskelly, D. H.
D'Aoust, Susan S.
Dane, Hildegard
Daoust, Renee E.
Davis, Jeremiah
Delbruck, M.
Denton, Charles
Devall, Bill
Dexter, Tana
Dexter, Thora
Dichsen, Roy
Dike, Alan D.
Dolese, Jennifer
Dolese, Don
Donohoe, Alvin W.
Downey, Janet
Dykema, Henry
Elliott, Judy
Elsberry, John C.
Emery, Paul
Ervin, Jack
Ervin, Lavonne
Evanko, Evelyn A.
Evans, Bill
Fahlberg, Larry
Fallon, Richard
Fears, Lee
Ferrera, Lou
Fields, Cobb W. , Jr
Finn, Vicki M.
Flood, Henrietta A.
Folson, L. C.
Ford, Frannie Lee

Fullerton, Robert E.
Gagacki, Don & Carolyn
Galitzine, Judy
Gallowway, Betty
Gammon, Kenneth J., Jr
Garnecki, Paul
Gaskill, Alton G., Jr
Gates, Micheal
Geilmer, Kim C.
Gemelas, Michele F.
Gentry, Gwen
Gerondale, Ron
Gessling, Richard C., DDD
Giddings, Ron
Gilbert, Ben
Glancy, James
Gold, Andy
Gonzalez, Susan
Grant, Marjorie A.
Green, Claire
Greene, Elizabeth W.
Groom, Imec L.
Grule, Deborah
Guss, Kirsten
Habein, H. C., Jr
Hagemyer, David
Hall, Mary G. P.
Hamel, David & Shelly
Hamilton, Anne
Hammer, William
Handelsman, Robert
Hanson, Kathleen
Harms, J .D.
Hart, Douglas S
Hart, Robert
Hartley, Lee Anne
Harton, Jack & Cindy
Harvey, Alan
Hathaway, Chris
Hauptman, Thomas M.
Hausen, Howard
Havens, Lynn T.
Hayden, Bill
Heacock, Craig
Healy, Larry
Heavener, Barbara
Hendricks, Paul M.
Henry, Marilee
Hess, Robert
High, Zundel, Ed & Florence
Hirsh, Sidney M.
Hoffman, Roland J.
Hogan, Chris
Hosker, Kathy
Houser, Dorothy
Howard, Jennifer
Isenberg, Lonny
Iverson, Carole J.
Jacobson, Abe
Jacoby, Barbara B.
Jaquith, Phil & Barbara
Jensen, Jarl S.
Johnson, Eugene
Johnson, John & Dorothy
Johnson, Marjorie
Johnson, Ralph
Jones, Cedron
Jones, Lynell
Kampmeyer, Alan R.
Karas, J.
Karkiewicz, Edward L.
Kawling, Jean H.
Kaye, John
Kelly, E. M.
Kerster, Chris
Kessler, Wallace F.
Keyes, Greg
Kidder, Richard & Mary
King, Jack E.
Kirk, George
Kirk, Roger
Kirkland, Diane
Kling, Barry
Klyza-McGregory, Christopher
Koelsch, Larry
Krase, Robert
Krassner, Lowell
Krzewinski, Robert A.
Kummer, Marian
Kutlas, Joseph
Lachmund, Barbara B.
Langdon, Richard
Langerbach, Harold
Latter, Daniel S.
Lawler, Mark
Leblanc, Thomas A.
Lee, Karole
Lee, Raymond K.
Leibrand, Roger J.
Letterman, Margaret K.
Lidtiger, Tanya
Lihou, Leslie
Lippert, Catherine
Litoff, Jacob
Litwnko, Tony
Lockhart, Marilyn & Pat
Lodge, Amy
Long, Dave
Lord, Mary Jean
Lueders, Dave & Cathy
Luehrs, Howard H.
Luehrs, Karen
Lynn, Cynthia
Mach, Barry
MacInnes, James
MacMorris, Margaret
Madigan, Noreen
Madsen, Robert C.
Magley, Beverly
Mansfield, Drummond
Marble, Cythnia A.
Marble, Frances W.
Marten, Paula L.
Martin, Drew
Martin, Kevin
Martinez, Alex
Mather, Patricia
Mattas, Virginia
McAnelly, Ralph & Barbara
McCaulay, Carley
McConnell, Gordon
McCool, Key & Mike
McCullough, Caroline E.
McEldery, Mary
McFarland, Milicent
McGraw, Jean
McKean, John W.
McKinney, Victor E.
McQuaide, James P.
McQuillan, Katherene
McRae, Colin
McSpadden, Linda A.
Meeker, Dennis
Meerschant, Tarron J.
Mends, Nigel
Merrifield, Kathy
Merriott, J. Frost
Meyer, Clarence F.
Meyers, Dick
Michalek, Tom
Milano, Diane
Miller, Deede
Miller, James Brake
Miller, Neil & Jennifer
Miller, Peggy
Miller, Wynn
Mills, Mark & Barbara
Minckler, Leon S.
Moises, Ben G.
Moore, James F., Jr
Moritz, Russ
Morrison, Robert C.
Morstein, Mona
Moss, Paul
Mueller, Michael J.
Murdoch, Eric
Murdoch, Michael E.
Murdock, Stephen
Murphy, Patrick J.
Nawrocki, James J.
Neal, Chuck
Neiman, Howard
Nelson, Daniel
Nelson, Doug
Nelson, John & Sharon
Nelson, N. W.
Nelson, William J.
Neri, Ogla G.
Nesbitt, Priscilla
Nichol, Lois B.
Norris, Frank
Noseworthy, Ruth R.
Novak, Kenneth
Ocrowley, Janet
Oldknow, Mark Z.
Olson, Virginia
Orum, Rowland M.
Ottinger, Joan
Palermo, Susan
Papanek, Paul
Parce, Don
Parks, Linda & Don
Passell, Seth
Pauli, Dave & Diane
Peck, Henry

Peick, Phil
Perga, Jennifer
Pettis, Margaret
Pipher, Gabriele
Pisaneschi, David
Pisio, Richard
Pittenger, Leea M.
Pixler, Tracey
Pluntze, John
Pomeroy, Tom
Porter, Les & Jenise
Powers, Julian
Priest, Jean H.
Pugh, Jo
Pursell, Craig
Putte, Matthew L.
Quinn, Thomas P.
Raile, Delmer
Randolph, John B.
Rauch, Todd K.
Redmond, Carmen D.
Reel, Judee
Reichard, Jason
Reilly, Lynne
Reiner, Mark & Caren
Reitz, Steve
Richardson, Gail & John
Rife, Cecilia
Ringer, Charles
Ringer, Emily
Ringer, June
Ringer, Mary
Rink, Paul E.
Ritchey, Karl P.
Ritchey, Kathie
Robb, Jack
Robbies, Jack
Roberts, John & Janice
Robison-Hodges, Phil
Rodriguez, Jeff
Rogers, John M.
Romersa, Elma S.
Rose, Delorise
Rose, Ray V.
Roselyn, Lily
Rosenthal, Jim
Rouch, Carl
Rowe, Anne C.
Ryan, David J.
Sand, Barbara & James
Sapers, Steve
Sargeant, Helen M.
Sargent, Hene P.
Satten, Corey
Satterwhite, John A.
Scermerhorn, Scot
Schaeffer, Robin L.
Schmidler, George
Schmidt, Phil
Schneider, Hannah G.
Schnell, Arthur R.
Schnell, William F.
Schreiber, H.
Schroeder, Arthur E.
Schultz, Dorothea
Schumacher, George
Scott, Megan R.
Seaquest, Anne
Seminara, Sandy & Ted
Semmens, John
Sherry, Thomas W.
Shesne, Kenneth S.
Shields, Judy
Siener, Michael J.
Sieracki, Dennis P.
Simon, James M.
Simpson, Cala J.
Sladen, Phyllis
Slaughter, David C.
Smedsrud, Jim
Smishek, Don & Judy
Smith, Ann E.
Smith, Harry F.
Smith, Jacobson & Linda
Smith, Jennifer
Smith, Rebecca
Smith, Sara D.
Smith, Zachary
Snyder, E. B.
Solinger, Ronald
Souvigney, Jeanne-Marie
Sparkman, Kevin & Suzzane
Speyer, Tim
Spitzer, Cameron
Spreyer, Frank L.
Stamm, Bryan
Staruch, Stephen
Starzensk, Tanya
Staudley, Nancy R.
Stauffer, Suzanne
Steele, William K.
Steinkraus, Robin
Stevens, Mike
Stock, Greg
Stockdale, Robert E.
Stone, Walt
Strasser, Scott E.
Strum, Ernest C.
Sureous, Frank
Sutton, Becky
Swanson, John R.
Swope, Virginia
Tafoya, Renee
Talbot, Ed
Teague, Jonathon
Thaeler, Marianne H.
Theobald, Diane
Thieneman, Andrew, Jr
Thomas, Bill
Thomas, Gary R.
Thomas, Lee
Thomason, Gayle
Thompson, David
Thompson, Kirk & Lisa
Thompson, Virginia & Henry
Tiffany, Todd
Tighe, Dennis
Tokarski, Mark
Toleno, Carol-Lynne
Torretta, Ron
Toubman, Sara
Toulouse, Margaret E.
Tourville, Jon
Tracewell, Joyce
Tracy, Susan W.
Vairo, Pasquale
Valtin, Heinz
Van Den Noort, Jeff
Van Driesche, Jason
Vaspol, Salvatore J.
Vellerga, Mary Ann
Vignere, Joel G.
Vinton, Joanne
Vischer, Marc
Voss, Rene
Waddell, David
Wade, John M.
Wagenheim, H.R.
Waggoner, Mark
Walden, Donald R.
Walensky, Karen
Wallace, Deborah
Wallace, Polly P.
Walter, Sydney
Ward, Robert L.
Warner, Iva
Warren, W. A.
Watson, Raymond E.
Webster, Jack
Wehner, Jane A.
Weiss, Merrily
Werner, Craig & Lea
Whalen, Ruth
Wheeler, Dori
White, Frank E.
White, Alan
Willey, Ray
Willis, Dave
Wills, Jeffery R.
Wilson, Richard
Wilson, Robert
Winn, William E.
Wolfe, Laura
Workman, Steve
Wyatt, W.R.
Young, Kent
Young, Linda C.
Young, Susan P.
Zeeb, Valerie & Keith
Zenbey, Ben
Zwinger, Susan

Listing of Respondents

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CHAPTER 6

List of Preparers

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List of Preparers

United State Department of Agriculture, Forest Service

Name	Title	Credentials	Experience Years
Northern Region			
Larry Blocker	Regional Landscape Architect	B.L.A. Landscape Architecture	16
Ed Heist	Forester, NEPA Specialist	B.S. Recreation	34
Richard Marshall	Mineral Economist	B.S. Business Admin M.A. Economics Ph.D. Mineral Economics	16
Barbara Plattes	Land Law Examiner	B.A. Education	10
Cheryl Stickney	Land Law Examiner	Leasing Specialist	9
Leslie Vaculik	Leasable Minerals Specialist	B.S. Chemical Engineering/MBA	15
Custer National Forest			
Supervisors Office			
Curtis W. Bates	Forest Supervisor	B.S. Range/Forestry	29
Gary Coats	Civil Engineer Technician		19
Vickey Cole	NEPA/Appeal Coordinator	A.A. Science & Business	14
Jeff DiBenedetto	Range Conservationist	B.S. Range Mgmt.	18
Carl Fager	EIS Coordinator	B.S., M.F. Forestry	28
James Fishburn	Resource Program Manager	B.S. Forestry	34
Ken Gehman	Visual Information Specialist		20
Jim Gray	Assistant Forest Planner	B.S. Forestry	27
Robin Harper	Office Automation Clerk		1
Gay Kary	SCSEP		8
Sue Karges	Information Assistant	B.A. Education	8
Halcyon LaPoint	Forest Archaeologist	M.A. Archaeology	17
Mary Lundsford	Secretary, Assistant PAO		10
Clinton McCarthy	Wildlife Biologist	B.S. Wildlife Mgmt.	15
Lee McConnel	Forest Soil Scientist	B.S. Forest Mgmt.	25
Sherry Milburn	Public Affairs Officer (PAO)	B.S. Biology M.S. Counseling	17
Susan Newell	Realty Specialist	B.S. Agriculture M.S. Education	5
Barbara Smith	Resource Clerk	Office Publisher Expert	8
Norman Smyers	Geologist	B.S., M.S. Geology	18
Ann Speer	Office Automation Clerk	L.P.N.	3
Charles Sundstrom	Biologist	B.S. Biology M.S. Forestry	32
Leroy White	Planning Program Manager	B.S. Forestry	32
Robert Wiegand	Forester	B.S. Wildlife	18

Beartooth Ranger District

Name	Title	Credentials	Experience Years
Gerard Baker	Assistant Ranger		
Tom Gonnoud	Forestry Technician		3
David Hatfield	Geologist	B.A., M.S. Geology	10
Chuck Mark	Forester	B.S. Resource Conservation	8
Pat Pierson	Forester	B.S. Forest Resource Mgmt. B.A. Geology	8
Kim Reid	Range Conservationist	B.S. Range Science	14
Linda Ward-Williams	District Ranger	M.A. Anthropology	14
Rich Wilkinson	Forestry Technician	A.A. Forestry	2

Gallatin National Forest

Name	Title	Credentials	Experience Years
Bruce May	Zone Fisheries Biologist	B.S. Zoology M.S. Fisheries Science	22
Mark Story	Air Resources	B.S. Fisheries M.S. Hydrology	17

Department of Interior, Bureau of Land Management

Name	Title	Credentials	Experience Years
Jan Barnhart	Cartographic Technician		6
Kevin Brooks	Computer Operator	B.S. Natural Resource Mgmt.	10
Sheila Cain	Cartographic Technician		6
Becky Casillas	Cartographic Technician		12
James Chapman	Geographer	B.S. Natural Resource Planning	11
Judy Huether	Cartographic Technician		6
Pat Ives	Cartographic Technician		4
Kathy Jewel	Computer Systems Manager		
George Long	Geologist	B.A. Geology	42
Randy Shardt	Cartographic Technician		6
Robert Sherger	Cartographic Technician		3
Kieth White	Cartographic Technician		4

GLOSSARY

GLOSSARY

Abandon	To cease producing oil or gas from a well when it becomes unprofitable. A wildcat (exploration) well may be abandoned after it has been proven nonproductive. Usually, some of the casing is removed and salvaged, and one or more cement plugs placed in the borehole to prevent migration of fluids between formations and/or to the surface.
Administrative Facilities	Those facilities, such as Ranger Stations, work centers and cabins, which are used by the Forest Service in the management of the National Forest.
Affected Environment	The biological and physical environment that would or may be changed by actions proposed and the relationship of people to that environment.
Airshed	Basic geographic units in which air quality is managed.
Alternative	A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making.
Alternative Energy	Energy sources not from naturally occurring hydrocarbons such as crude oil or natural gas. This category may include nuclear, solar, and any other form of energy that would reduce dependence upon hydrocarbons.
Ancillary	Equipment, tools, buildings, and facilities that are needed to perform the full development of fluid mineral resources. Depending upon the level of development and stage these may be tank batteries, treaters, separators, flaring stacks, oil or water pipelines, tool sheds, pump units and etc.
Application for Permit to Drill, (APD)	The Department of Interior application permit form to authorize oil and gas drilling activities on Federal land.
Aquatic Ecosystem	A stream channel, lake or estuary bed, the water itself, and the biotic communities that occur therein.
Background viewing area	A landscape viewing area visible to a viewer from approximately three to five miles to infinity.
Best Management Practices (BMP)	A practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practical means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (40 CFR 130.2g).
Best Available Control Technology (BACT)	The best available air pollution control technology for a given purpose as stipulated by the Environmental Protection Agency (EPA).
Big Game	Those species of large mammals normally managed as a sport hunting resource.
Biological Evaluation (BE)	A documented review of all Forest Service planned, funded, executed or permitted programs and activities for possible effects on endangered, threatened, proposed or sensitive species. A biological evaluation may be used or modified to satisfy consultation requirements for biological assessment of projects requiring an Environmental Impact Statement.

Biological Opinion	An official report by the US Fish and Wildlife Service (FWS) issued in response to a formal Forest Service request for consultation or conference. It states whether an action is likely to result in jeopardy to a species or adverse modification to its critical habitat.
Blowout	An uncontrolled expulsion of gas, oil, or other fluids from a drilling well. A blowout or "gusher", occurs when formation pressure exceeds the pressure applied to it by the column of drilling fluid and when blowout prevention equipment is absent or fails.
Blowout Preventer (BOP)	A stack or an assembly of heavy-duty valves attached to the top of the casing during drilling to control well pressure and prevent fluid or gas loss in the event of excess pressure buildup and a potential blowout. The assembly includes a remote mechanism to actuate closing by hydraulic or mechanical means.
Brackish Water	Water that contains relatively moderate concentrations of any soluble salts. Brackish water is saltier than fresh water but not as salty as salt water or brine water.
Brine	Water containing relatively large concentrations of dissolved salts, particularly sodium chloride. Brine has higher salt concentrations than ordinary ocean water.
Brine Pit	An excavated pit used to hold brine produced from a well.
Buffer Zone	Defined as: ●An area between two different land uses that is intended to resist, absorb, or otherwise preclude developments or intrusions between the two use areas. ●A strip of undisturbed vegetation that retards the flow of runoff water, causing deposition of transported sediment and reducing sedimentation in the receiving stream.
Bureau of Land Management (BLM)	The Department of Interior agency responsible for managing most Federal government subsurface minerals. BLM also has surface management responsibility for Federal lands assigned to it.
Casing	Steel pipe placed in an oil or gas well to prevent the hole from collapsing.
Christmas Tree	The control valve, pressure gauges, and chokes assembled at the top of a well to control the flow of oil and gas after the well has been completed.
Class II Injection Well	A well, as defined by the U.S. Environmental Protection Agency, that injects fluids: a. that have been brought to the surface in connection with oil or natural gas production (produced waters); b. for enhancing recovery of oil or natural gas; or c. for storing liquid hydrocarbons.
Closed Mud System	A drill mud system that reuses or reclaims all the drilling fluid used. Oil-base mud systems are often closed mud systems.
Code of Federal Regulation (CFR)	Regulations developed at the Department level for the specific implementation of a Public Law. For example, 36 CFR 228 are the implementing regulations for the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA).
Core Ranges (Big game)	Those portions of home ranges of animals that receive disproportionately high seasonal use and therefore are deemed key habitat for the herd.
Completion	The activities and methods to prepare a well for production. Includes installation of oil or gas well production equipment.

Conditions of Approval (COA)	Mitigation measures applied at the time a Plan of Operation for the Application for Permit to Drill is approved. These are site specific and may not modify the original intent of the lease or interfere with the rights granted in it.
Congressionally Designated Areas	Areas established by Congressional legislation, such as National Wildernesses, National Wild and Scenic Rivers, and National Recreation Areas.
Controlled Surface Use (CSU) Stipulation	The CSU stipulation is intended to be used when fluid mineral occupancy and use are generally allowed on all or portions of the lease area year-round, but because of special values, lease activities must be strictly controlled. The CSU stipulation is used to identify constraints of surface use and operations which may otherwise exceed the mitigation provided by Section 6 of the standard lease terms and other operating orders. This stipulation is limited to specific activities rather than all activity.
Corridor (Utility Corridor)	A linear strip of land which has ecological, technical, economic, social, or similar advantages over other areas for the present or future location of transportation or utility routes.
Council On Environmental Quality (CEQ)	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.
Critical Habitat	Specific areas within the geographical area occupied by threatened, endangered or sensitive species on which are found those physical and biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection. Critical habitat shall not include the entire geographic area which can be occupied by the threatened and endangered species.
Cultural Resources	The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.
Deepen	To increase the depth of a well. Deepening is generally a workover operation carried out to produce from a deeper formation or to control excessive gas found in the upper levels of a reservoir.
Developed Recreation	Recreation that occurs where improvements have been added to enhance recreation opportunities and accommodate intensive recreation activities in a defined area.
Developed Recreation Sites	Relatively small, distinctly defined areas where facilities such as hardened trailer and tent pads, roads, drinking water, toilets, parking areas, picnic tables and fireplaces are provided for concentrated public uses, (i.e. campgrounds, picnic and swimming areas).
Development Well	A well drilled in proven territory (usually within 1 mile of an existing well.)
Directional Drilling	The intentional deviation of wellbore from vertical to reach subsurface areas not directly under the drilling site.
Dispersed Recreation	That portion of outdoor recreation use which occurs outside of developed sites in the unroaded and roaded Forest environment, (i.e. hunting, backpacking and berry picking).
Displacement	As applied to wildlife, forced shifts in the patterns of wildlife use, either in location or timing of use.

Disposal Well	A well into which produced water from other wells is injected into an underground formation for disposal.
District Ranger	The official responsible for administering the National Forest System lands on a Ranger District.
Diversity	The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.
Drainage	The uncompensated loss of hydrocarbons from Federal lands from wells on adjacent nonjurisdictional lands or jurisdictional lands with lower participation, allocation, royalty rate or distribution of funds, resulting in revenue losses to the Federal lessor.
Drill Pipe	The heavy seamless tubing used to rotate the drill bit and circulate the drilling fluid. The standard drill pipe section is 30 feet long (a joint).
Drill Rig	The mast, drawworks, and attendant surface equipment of a drilling or workover unit.
Dry Hole	Any well incapable of producing oil or gas in commercial quantities. A dry hole may produce water, gas or even oil, but not enough to justify production.
Ecogroup	Ecosystems grouped on the basis of capabilities for the type of land uses that occur.
Ecosystem	A complete, interacting system of organisms considered together with their environment, for example; marsh, watershed or lake.
Effects (See Impacts)	Physical, biological, social and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect and cumulative and may be either beneficial or detrimental.
Elevated Flares	The use of piping and a burn stack to elevate the flare that burns unusable petroleum vapors. Elevated flares may include an ignitor to ensure continuous burning or an incinerator where gas is added to ensure complete combustion of petroleum products.
Endangered Plants	See Threatened and Endangered Species.
Endangered Species	See Threatened and Endangered Species.
Enhanced Recovery	The use of artificial means to increase reservoir pressures or reduce fluid resistance to increase the amount of hydrocarbons that can be recovered from a reservoir. A reservoir depleted by normal extraction practices usually can be restored by secondary or tertiary methods of enhanced recovery.
Environmental Analysis (EA)	An analysis of alternatives actions and their predictable short and long term environmental effects which include physical, biological, economic, social and environmental design factors and their interactions. Completion of this level of analysis may result in a Decision Notice (DN) and Finding of No Significant Impact (FONSI).
Draft Environmental Impact Statement (DEIS)	A detailed written statement as required by Sec. 102 (2)(C) of the National Environmental Policy Act (NEPA).

Final Environmental Impact Statement (FEIS)	The final version of the public document required by NEPA.
Erosion	The group of processes whereby earthy or rocky material is worn away by natural sources such as wind, water or ice and removed from any part of the earth's surface and redeposited elsewhere.
Exploration Well	A well drilled in an area where there is no oil or gas production. Same as a "wildcat" well.
Flare	The piping and burners used to dispose (by burning) of unusable vapors from a well or collection plant. The flaring of oil field gas is regulated by the Montana Board of Oil and Gas Conservation, and may require an air quality permit from the Montana Department of Health and Environmental Sciences.
Forage	All browse and nonwoody plants available to livestock or wildlife for feed.
Foreground Viewing area	The landscape area visible to an observer from the immediate area to ½ mile.
Forest Plan	A comprehensive management plan prepared under the National Forest Management Act of 1976 that provides standards and guidelines for management activities on the Custer National Forest. The Custer Forest Plan was approved June 1987.
Forest Service (FS)	The agency of the United States Department of Agriculture responsible for managing National Forests and Grasslands.
Fracture Treatment	A method of stimulating well production by increasing the permeability of the producing formation. Under extremely high hydraulic pressure, the fracturing fluid (water, oil, dilute hydrochloric acid, or other fluids) is pumped into the formation and parts or fractures it. Proppants or propping agents such as sand or glass beads are pumped into the formation as part of the fracturing job. The proppants become wedged in the opened fractures, leaving channels for oil to flow into the well after the hydraulic fracture pressure is released. This process is often called a "frac job". When high concentrations of acid are used, it may be called an "acid-frac job".
Game Species	Any species of wildlife or fish for which seasons and bag limits have been prescribed under State or Federal Laws, Codes and Regulations, and which are normally harvested by hunting, trapping, and fishing.
Greater Yellowstone Area (GYA)	The name given to an area of roughly 11.7 million acres encompassing portions of six National Forests and two National Parks. Yellowstone National Park forms the core of the area and is surrounded by the contiguous portions of the National Forests and Grand Teton National Park. The GYA has been studied and is managed under "A Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area", September 1991.
Habitat Type	An aggregation of all land areas potentially capable of producing similar plant communities at climax.
Habitat Type Group	A logical grouping of habitat types to facilitate resource planning and public presentations.
Hiding Cover	Trees or other vegetation of sufficient size and density to conceal animals from view at 300 feet.

High Seral	The last seral stage before a vegetation community becomes climax.
Human Environment	The factors that include, but are not limited to biological, physical, social, economic, cultural and aesthetic factors that interrelate to form the environment.
Impacts (See Effects)	Physical, biological, social and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect and cumulative and may be either beneficial or detrimental.
Indicator Species	In the Forest Plan, a species of animal or plant whose presence is a fairly certain indication of a particular set of environmental conditions. Indicator species serve to show the effects of development actions on the environment.
Indirect Effects	Secondary effects which occur in locations other that the initial action or significantly later in time.
Injection Well	A well used to inject fluids into an underground formation to increase reservoir pressure.
Interdisciplinary Team (ID Team)	A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view to bear on the problem.
Key Wildlife Area	Any area which is critical to wildlife during at least a portion of the year. This importance may be due to vegetative characteristics such as residual nesting cover, or behavioral aspects of the animals such as lambing areas. Key areas include: winter ranges, lambing/fawning/calving areas, dancing/strutting grounds, nesting areas, breeding grounds, elk wallows, riparian and woody draws, and roosting areas.
Land Exchange	The conveyance of non-Federal land or interest to the the United States in exchange for National Forest System land or interests in land.
Lease	A lease is defined as: •A legal document that conveys to an operator the right to drill for oil and gas. •The tract of land, on which a lease has been obtained, where wells and production equipment may be located.
Lease Notice	An attachment to a lease to transmit information to the lessee at the time of lease issuance for submitting acceptable plans of operation, or to assist in administration of leases. The Lease Notice does not involve new restrictions or requirement, but it informs the lessee of any requirements in a law, regulation, standard lease term, or onshore oil and gas orders.
Low Seral	The earliest stage of plant succession; the stage where pioneer plants inhabit a community.
Management Area	An aggregation of capability areas which have common management direction under the Forest Plan and may be noncontiguous in the Forest. Consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.
Management Direction	A statement of multiple-use and other goals and objective, the associated management practices identified by the Forest Service in the planning process.
Mid Seral	The middle stage of plant succession.
Middleground Viewing Area	The landscape area visible to a viewer from ½ mile to about three to five miles.

Mineral Rights	Mineral rights outstanding are third party rights, an interest in minerals not owned by the person or party conveying the land to the United States. It is an exception in the deed which is the result of a prior conveyance separating title of certain minerals from the surface estate. Reserved mineral rights are the retention of ownership of all or part of the mineral rights by a person or party conveying land to the United States. Conditions for the exercising of these rights have been defined in the Secretary's "Rules and Regulations to Govern Exercising of Mineral Rights Reserved in Conveyance to the United States" attached to and made a part of a deed reserving mineral rights.
Mitigation	To lessen the severity of environmental impacts by: ●Avoiding by not taking a certain action or parts of an action. ●Minimizing by limiting the degree or magnitude of an action and its implementation. ●Rectifying by repairing, rehabilitating, or restoring the affected environment. ●Reducing or eliminating over time by preservation and maintenance operations during the life of an action or the time period thereafter during which an impact continues.
Monitoring and Evaluation	The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied.
Multiple Use (MU)	The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people by making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions and recognizing that some lands will be used for less than all of the resources. It also provides for harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.
National Environmental Policy Act of 1969 (NEPA)	An act which encourages productive and enjoyable harmony between man and his environments; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enriches the understanding of the ecological systems and natural resources important to the Nation; and establishes a Council on Environmental Quality.
National Forest System	Includes all National Forest System lands reserved or withdrawn from the public domain of the United States; all National Forest System lands acquired through purchase, exchange, donation, or other means; the national grasslands; and land utilization projects administered by the Forest Service under Title III of the Bankhead-Jones Farm Tenant Act of 1937.
National Wild and Scenic River System	Rivers with outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values designated by Congress and the Wild and Scenic Rivers Act of 1968 for preservation of their free-flowing condition.
No Action Alternative	The management direction, activities, outputs, and effects that are likely to exist in the future if the current trends and management would continue unchanged. Under NEPA it means following the current approved Forest Plan management direction and guidance.
Nongame	Species of animals which are not managed as a sport hunting resource.

Nonpoint Source Pollution	Sources, including natural pollution sources not directly or indirectly caused by man, from which the pollutants discharged are: •Induced by natural processes, including precipitation, seepage, percolation, and runoff. • Not traceable to any discrete or identifiable facility. •Better controlled through the utilization of Best Management Practices, including process and planning techniques.
No Surface Occupancy (NSO) Stipulation	Alternatives 2, 3, 4, and 5: A lease clause which, if attached to a mineral lease, prohibits the lessee from constructing well pads or otherwise occupying the land surface to protect the identified resource values. This clause does not cover the construction of roads and corridors for powerlines and pipelines. Approval of these facilities is guided by the standards and guides in the Forest Plan. Alternative 4A: A lease clause which, if attached to a mineral lease, prohibits the lessee from all use or occupancy of the land surface for fluid mineral exploration or development to protect the identified resource values. Roads, powerlines, and pipelines, as well as the well pad and any ancillary structures, may not be constructed by the lessee on that portion of the lease covered by this stipulation.
Particulates	Small particles suspended in the air and generally considered pollutants.
Pit Flaring	The burning of unusable petroleum vapors in an excavated pit.
Policy	A guiding principle upon which is based a specific decision or set of decisions.
Prehistoric Site	Archeologic sites associated with American Indians and usually occurring before contact with Europeans.
Prevention of Significant Deterioration of Air Quality (PSD)	A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act (42 U.S.C. 1875 et 15q).
Primitive Recreation Setting	A classification of the recreation opportunity spectrum (ROS) that characterizes an essentially unmodified natural environment of a size or remoteness that provide significant opportunity for isolation from the signs and sounds of man and a feeling of vastness of scale. Visitors have opportunity to be part of the natural environment, encounter a high degree of challenge and use a maximum of outdoor skills but have minimum opportunity for social interaction.
Reclamation	Rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation and other work such as fertilization and fencing necessary to restore it for use.
Recreation Opportunities	The combination of recreation settings, activities and experiences provided by an area.

Recreation Opportunity Spectrum (ROS)	A system for planning and managing recreation resources that recognizes recreation activity opportunities, recreation settings, and recreation experiences along a spectrum or continuum of settings as follows: • **Primitive** - Characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use is not permitted. • **Semi-Primitive Non-Motorized** - Characterized by predominately natural or natural appearing environment of a moderate to large size. Concentrations of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted. • **Semi-Primitive Motorized** - Characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted. • **Roaded Natural** - Characterized by predominantly natural appearing environment with moderate evidence of the the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with the evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Motorized use is permitted. • **Rural** - Characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. • **Urban** - Characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Vegetative cover is often exotic and manicured. Sights and sounds of humans on-site are predominant.
Recreation Visitor Days (RVD)	One visitor day equals 12 hours of human use (one person for 12 hours, or 12 people for 1 hour, or any combination thereof).
Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)	The parent act that preceeded Forest Planning. This act directed that the National Forest System begin systematic resource planning on the National Forest units.
Leasing Reform Act of 1987	The Federal Onshore Oil and Gas Leasing Reform Act of 1987. (FOOGLRA). Implementing regulations are found in 36 CFR 228.
Reserve Pit	Defined as: •An excavated pit that may be lined with plastic, that holds drill cuttings and waste mud. •A standby pit which holds already-mixed drilling mud for use in an emergency.

Revegetation	The reestablishment and development of self sustaining plant cover. On disturbed sites, this normally requires human assistance such as seed bed preparation, reseeding and mulching.
Rig	The mast, drawworks, and attendant surface equipment of a drilling or workover unit.
Riparian Areas	Geographically delineable areas with distinctive resource values and characteristics that comprise the riparian ecosystems.
Riparian Ecosystem	A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.
Roaded Natural Appearing Recreation Setting	See Recreation Opportunity Spectrum (ROS)
Roadless Area	A National Forest area which: a) is larger that 5000 acres or, if smaller that 5000 acres, contiguous to a designated wilderness or primitive area; b) contains no roads and c) has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System.
Roadless Area Review and Evaluation (RARE II)	A comprehensive process, instituted in June 1977, to identify roadless and undeveloped land areas in the National Forest System and to develop alternatives for both wilderness and other resource management.
Rural Recreation Setting	See Recreation Opportunity Spectrum (ROS)
Saline Water	Water containing high concentrations of salt (see also brine water and brackish water).
Scoping Process	An early and open public involvement process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and deemphasizing insignificant issues, narrowing the scope of the Environmental Impact Statement accordingly. (Ref. CEQ Regulations, 40 CFR 1501.7).
Sediment	Solid mineral or organic material that is transported by air, water, gravity, or ice.
Seismic Exploration	Seismic exploration is used to map underground geological features to obtain information on the earth's subsurface and to locate areas where accumulations of oil and gas might occur. Seismic waves, generated at or near the surface, penetrate the earth's crust and reflect from subsurface rock layers back to the surface. The geophysicist receives a printed record or seismograph from which is measured the depth to various strata and from which subsurface structures with a potential for oil and gas accumulation can be determined such as faults, anticlines, and folds.
Seismic Operations	Use of explosive or mechanical thumpers to generate shock waves that can be read by special equipment to give clues to subsurface conditions.
Semi-Primitive Recreation Setting	See Recreation Opportunity Spectrum (ROS)

Sensitive Species	Those plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations and will be managed similar to threatened or endangered species. The Forest Service policy is to ensure that species would not be affected in such a manner as to have them listed or proposed for listing as threatened or endangered.
Seral	A biotic community which is developmental; a transitory stage (sere) in an ecologic succession.
Small Game	Birds and small mammals normally sport hunted or trapped .
Soil Productivity	The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture and nutrients and length of growing season.
Sour Well	In an oil or gas well, a condition caused by the presence of hydrogen sulfide or another sulfur compound.
Split Estate	A term that refers to different ownership of the surface and subsurface properties. For example, the Federal government may own the surface and a private person or persons may own the minerals underlying the parcel.
Standard Lease Terms and Conditions	The terms and conditions contained in Bureau of Land Management Form 3100-11, Offer To Lease And Lease For Oil And Gas. This form contains the minimum terms and conditions to which stipulations and Lease Notices may be attached.
Step-Out Well	A well drilled adjacent to or near a proven well to ascertain the limits of the oil or gas reservoir. An outpost is a well drilled a further distance from a step-out but still on the same structural trend. (Distance could be a couple of miles).
Stipulations (Stips)	Requirements that are part of the terms of a mineral lease. Some stipulations, called standard terms, occur on all Federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources and uses.
Sweet Well	An oil or gas well lacking sulfur and any significant amount of hydrogen sulfide or mercaptans.
Tank Battery	A group of production tanks that store crude oil in the field.
Timing Limitations (TL) Stipulation	This stipulation (often called seasonal) prohibits fluid mineral exploration and development activities for time periods less than yearlong. A TL is not necessary if the time limitation involves the period of prohibition of new surface disturbing activities for less than 60 days (43 CFR 3101.1-2).
Threatened, Endangered and Sensitive Species (TES)	Any species, plant or animal, which is likely to become a threatened or endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.
Understory	The trees and other woody species which grow under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.
Variety Classes	An intermixing or succession of different things or qualities in a landscape such as dominance, form, color and texture.

Visual Management System	A management system that establishes the "visual landscape" as a basic resource, treated as an essential part of the land. The visual management system provides a framework to inventory the visual resource and provides measurable standards for its management.
Visual Quality Objective (VQO)	A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape as follows: ● Preservation: In general, human activities are not detectable to the visitor. ● Retention: Human activities are not evident to the casual Forest visitor. ● Partial Retention: Human activities may be evident, but must remain subordinate to the characteristic landscape. ● Modification: Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in middle ground or background. ● Maximum Modification: Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background. ● Enhancement: A short term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.
Visual Resource	The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.
Watch Species	Wildlife and plant species that the Montana Heritage has listed as being of special concern. They are not on threatened and endangered lists nor are they on the Northern Region sensitive lists.
Wildcat Well	An exploratory well drilled in an area where there is no oil or gas production.

APPENDIX A

OIL AND GAS POTENTIAL

AND

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

INTRODUCTION

The reasonably foreseeable development (RFD) scenario is based on past oil and gas activity, geologic potential for oil and gas occurrence, development, economics, and geologic factors. The primary components of the RFD scenario are the "drilling and development activity forecast" and the "surface use forecast." These projections are speculative but useful when based on the discovery rate, cumulative and ultimate production, field life, field size, field distribution and density, well spacing, petroleum type, and other information specific to a geologic province or geologic play.

By design, the RFD estimates the form and scale of predicted exploration and development. As an analysis tool the RFD assists the interdisciplinary team and the document reader alike in assessing the relative scale and environmental effects of predicted oil and gas exploration and development. The RFD prediction is unconstrained with respect to the standards applied in past land use planning decisions as well as standards originating from future project or land use decisions. The RFD prediction is constrained only by congressional acts/laws and general Federal oil and gas regulations.

GEOGRAPHIC SCOPE OF THE RFD

The geographic scope of the RFD analysis area will include the non-Wilderness acres within the administrative boundaries of the Beartooth Ranger District in addition to other lands adjacent to the District. These lands are located along the northern and eastern margins of the Beartooth Mountains and a small area, managed by the Custer NF, just north of Cooke City, Montana. Approximately 46,000 acres of National Forest System lands are currently leased for oil and gas within the project area.

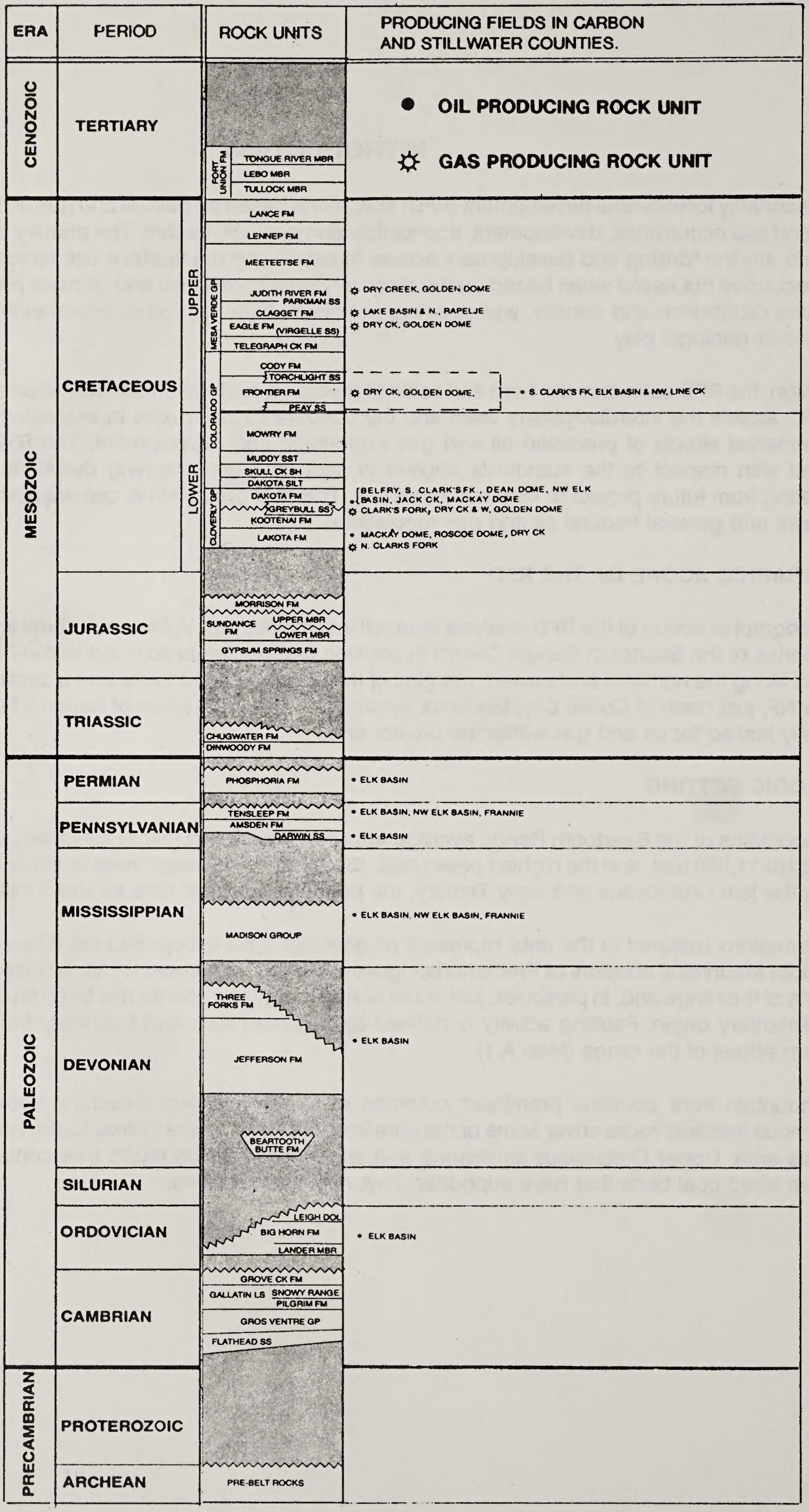
GEOLOGIC SETTING

The mountains of the Beartooth Range average approximately 8,000 feet in elevation, with plateaus occurring at 9,000 to 11,000 feet, and the highest peaks near 13,000 feet. The range owes its elevation to uplift and faulting during the late Cretaceous and early Tertiary, the period of geologic time 60 to 45 million years ago.

The formations mapped in the area represent all geologic ages except Silurian (Figure A.1). The core of the Beartooth Mountains consists of Precambrian igneous and metamorphic rocks, granite and gneiss. Along the margins of the range and, in particular, just south of Red Lodge this granite has been faulted over younger rocks of sedimentary origin. Faulting activity is defined by upturned rock and boundary faults along the east and northern edges of the range (Map A.1).

The mountain front contains prominent outcrops of Madison Group limestone known as the "Palisades." Cretaceous volcanic rocks cover some of the area from the Dean Dome vicinity to the northwestern edge of the analysis area. Upper Cretaceous sandstone and shale units can be found that contain interbedded thin to medium sized coal beds that have supported past mining operations.

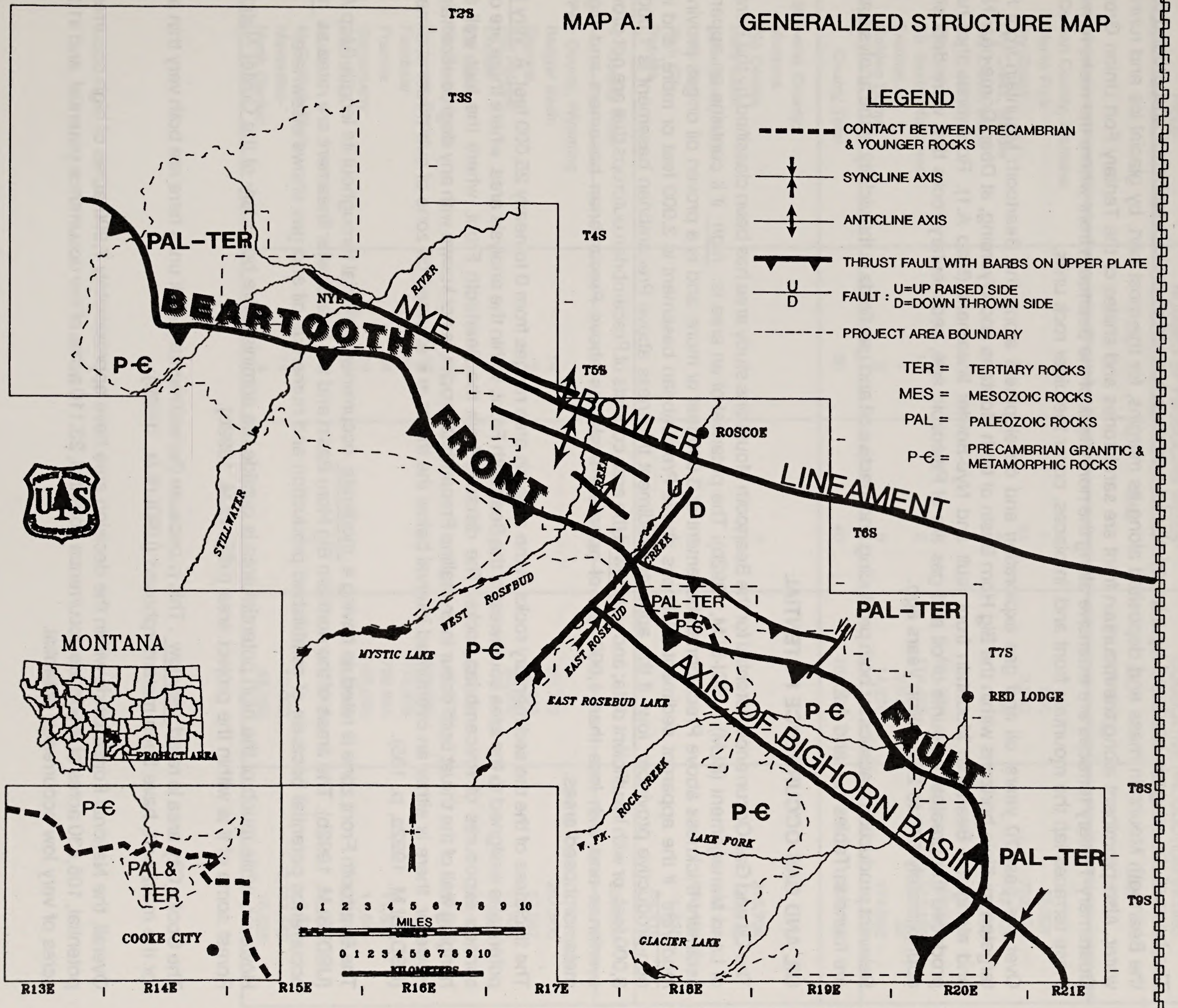
FIGURE A.1 STRATIGRAPHIC COLUMN



MODIFIED FROM ANNUAL REVIEW FOR THE YEAR 1990 RELATING TO OIL AND GAS, MONTANA DEPT. OF NATURAL RESOURCES - OIL AND GAS CONSERVATION DIVISION.

BEARTOOTH MOUNTAINS OIL & GAS LEASING EIS

MAP A.1 GENERALIZED STRUCTURE MAP



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The base of the range is bordered by a broad alluvial apron composed of rocks weathered and eroded from the Beartooth Mountain mass and deposited along its margins, for the most part, by glacial ice and running water. Also prominent along the mountain front are sandstones and shales of the Tertiary Fort Union Group. Quaternary-Tertiary terraces are extensive along the north flank of the Beartooth front where the rocks forming these terraces lap the mountain front and, in places, cover the older rock units.

Over the past 70 years, oil and gas exploration and development along the Beartooth Mountain front has targeted multiple horizons within the Big Horn Basin of both Montana and Wyoming, at Dean Dome near Nye, and along the Beartooth Mountain front fault and Nye-Bowler lineament (Map A.1). Rock units that have produced the greatest amounts of oil and gas are of Paleozoic age, sedimentary rocks that were deposited approximately 570 to 225 million years ago.

Relevant production statistics for both producing and inactive oil and gas fields in the vicinity of the analysis area are found in Tables A.1 and A.2.

OIL AND GAS OCCURRENCE POTENTIAL

The Oil and Gas Occurrence Potential for the Beartooth Mountains study area has been classified by the Bureau of Land Management (BLM) (USDI-BLM, 1992b). The potential of an area is: *high* if it contains an apparent sediment thickness above Precambrian basement of 3,000 feet or more, and is a proven oil or gas province; *moderate* if the apparent sediment thickness above Precambrian basement is 3,000 feet or more, and in a non-productive province; *low* if the apparent sediment thickness above Precambrian basement is 1,000 to 3,000 feet, or with insufficient data; and *very low* if the area consists of Precambrian outcrops that are not proven overthrust and with less than 1,000 feet of apparent thickness above Precambrian basement and highly metamorphosed areas.

The thickness of the the sedimentary rocks in the analysis area ranges from 0 to nearly 25,000 feet. A very low potential is assigned to the area southwest of the Beartooth Front, within the analysis area, where there are only surface exposures of Precambrian rocks. The distance from the Beartooth Front, where the foot wall and hanging wall of the thrust both occur in crystalline Precambrian rocks, is not known with any degree of certainty. However, there is either an overturned interval below the thrust or a sheared off zone of sub-thrust sediments (USDI-BLM, 1992a, p. 135).

The Beartooth Front zone is rated as having a moderate occurrence potential throughout its length (Map A.2) (USDI-BLM, 1992b). The areas of the northern Big Horn Basin and the Nye-Bowler lineament are rated as high occurrence potential because of established production and numerous oil and gas shows elsewhere.

However, while much of the high potential area is outside the administrative boundary of the Custer National Forest some of it is within the project area (USDI-BLM, 1992b).

The Cooke City area is rated very low . This is because the sedimentary rock units here are both very thin and, for the most part, have been metamorphosed (USDI-BLM, 1992b).

Overall, the National Forest lands within the decision area have approximately 7,900 acres of high occurrence potential, 105,830 acres of moderate occurrence potential, 23,110 acres of low occurrence potential, and 41,270 acres of very low occurrence potential.

TABLE A.1
Producing Oil and Gas Fields

FIELD	NUMBER OF PRODUCING WELLS*		CUMULATIVE PRODUCTION IN 1990	
	OIL	GAS	OIL (In BARRELS)	GAS (In MCF)
Carbon County, Montana				
Clarks Fork		1	696	28,801
Dry Creek	0	24	3,552	732,475
Dry Creek, Middle	1	2	156	47,707
Dry Creek, (Gas)		1		29,996
Dry Creek, West		1	1,227	29,019
Elk Basin	46	1	594,080	388,586
Elk Basin, Northwest	10	2	114,405	115,163
Frannie	1		2,671	22
Golden Dome	2	8	14,270	174,822
County Total	60	40	730,361	1,508,790
Stillwater County, Montana				
Big Coulee		7		215,709
Lake Basin		17		147,749
Lake Basin, North		1		3,104
Little Basin		4		106,494
Park City		1		1,635
Rapelje		10		54,818
County Total		40		529,509
Park County, Wyoming				
Badger Basin	14		20,772	267,508
Bearcat	5		18,438	50,567
Big Polecat	9		28,940	73,424
Coulee		1		10,993
Elk Basin	181		2,620,708	7,718,425
Elk Basin, South	11		40,375	145,845
Ferguson Ranch	12		105,960	
Fourbear	40		175,978	
Frannie	64		708,645	11,537
Gooseberry	10		165,006	11,541
Half Moon	31		258,143	196,240
Hunt	4		27,218	
McColloch Peak		1		4,814
Meeteetse	14		10,092	2,183,449
North Danker	4		43,380	16,025

TABLE A.1 (Continued)

FIELD	NUMBER OF PRODUCING WELLS		CUMULATIVE PRODUCTION IN 1990	
	OIL	GAS	OIL (In BARRELS)	GAS (In MCF)
Park County, Wyoming (Continued)				
Oregon Basin, S.E.	3		28	351,219
Oregon Basin West	2		8,612	
Pitchfork	61		1,866,582	
Ralston	1		2,190	
Rose Creek	2		13,392	
Sage Creek West	7		22,746	
Seller Draw		1		15,710
Sheep Point	3		11,408	
Shoshone	13		120,313	
Shoshone North	2		3,255	
Silver Tip	9		12,642	64,437
Silver Tip South	2		1,064	20,860
Spring Creek South	35		401,234	
T.E. Ranch	2		5,194	
Whistle Creek	5		23,977	77,915
Whistle Creek South		2		8,354
Wiley	1		3,915	3,580
Willow Draw	16		26,080	
County Total	559	5	8,746,287	11,547,949
Montana/Wyoming Total			7,476,648	13,586,248

*NOTE: Wells producing oil and associated gas in Wyoming are classified as oil wells regardless of the volume of associated gas produced.

Barrel=42 gallons
MCF=Thousand cubic feet

Sources: Montana Oil and Gas Division, 1991; and Wyoming Oil and Gas Conservation Commission, 1991.

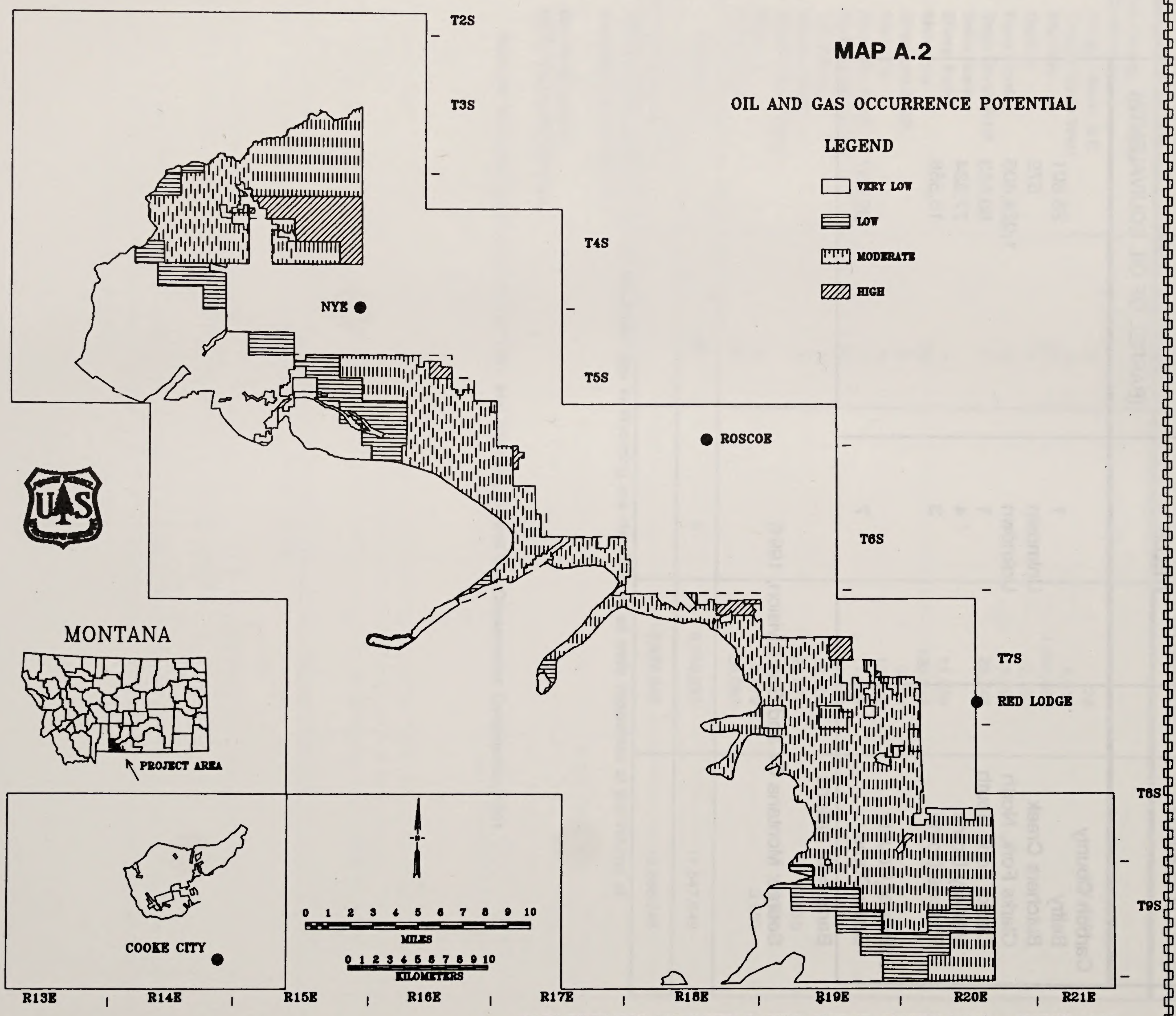
TABLE A.2
Inactive Montana Oil and Gas Fields

FIELD	NUMBER OF SHUT-IN WELLS	CUMULATIVE PRODUCTION TO 1990 (BARREL OF OIL EQUIVALENTS)
Carbon County		
Belfry	1	28,801
Butchers Creek	Unknown	579
Clarks Fork, North	Unknown	1,024,608
Clarks Fork, South	1	80,553
Mackay Dome	4	77,334
Roscoe Dome	3	15,556
Stillwater County		
Dean Dome	7	92,597

Barrel=42 gallons

Source: Montana Oil and Gas Division, 1991.

BEARTOOTH MOUNTAINS OIL & GAS LEASING EIS



MAP A.2

OIL AND GAS OCCURRENCE POTENTIAL

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OIL AND GAS DEVELOPMENT POTENTIAL

Historically, the area covered in this leasing analysis has experienced a low level of oil and gas exploration and development. During the past fifteen years only two wells have been drilled within the project area.

Availability strongly influences development potential rating. That is, if an area has, by law or administrative action, been made unavailable for oil and gas exploratory and/or development activity it is given a very low development potential rating. For example, the lands contained within the boundaries of the the Absaroka-Beartooth Wilderness would be given a very low development potential not because oil and gas resources might be absent beneath these lands but, rather, because the Wilderness act that created the Wilderness makes the lands within the Absaroka-Beartooth Wilderness unavailable for leasing and, likewise, oil and gas exploration and development.

Development potential is: *high* if the sedimentary section present has proven production and/or significant hydrocarbon shows and high levels of development activity is anticipated in the next 15 years; *moderate* if sedimentary section is present and moderate levels of development activity are anticipated in the next 15 years; *low* if the sedimentary section is thin and/or insufficient sub-surface data is available and a low level of development is anticipated in the next 15 years; and *very low* if no sedimentary section is present at the surface, sub-surface data is insufficient, and a very low level of development activity is anticipated in the next 15 years.

Based on the availability of lands, as influenced by the Absaroka-Beartooth Wilderness Act and the Record of Decision for the Custer National Forest Plan and Final Environmental Impact Statement (1987), the National Forest lands within the decision area have approximately 870 acres of high development potential, 30,470 acres of moderate development potential, 109,430 acres of low development potential, and 37,340 acres of very low development potential (USDI-BLM, 1992b).

The only high development potential is anticipated northeast of the Beartooth Front fault in the vicinity of Mackay and Dean Domes where drilling depths to Precambrian basement rocks should be less than 8,000 feet (Map A.3) (USDI-BLM, 1992b).

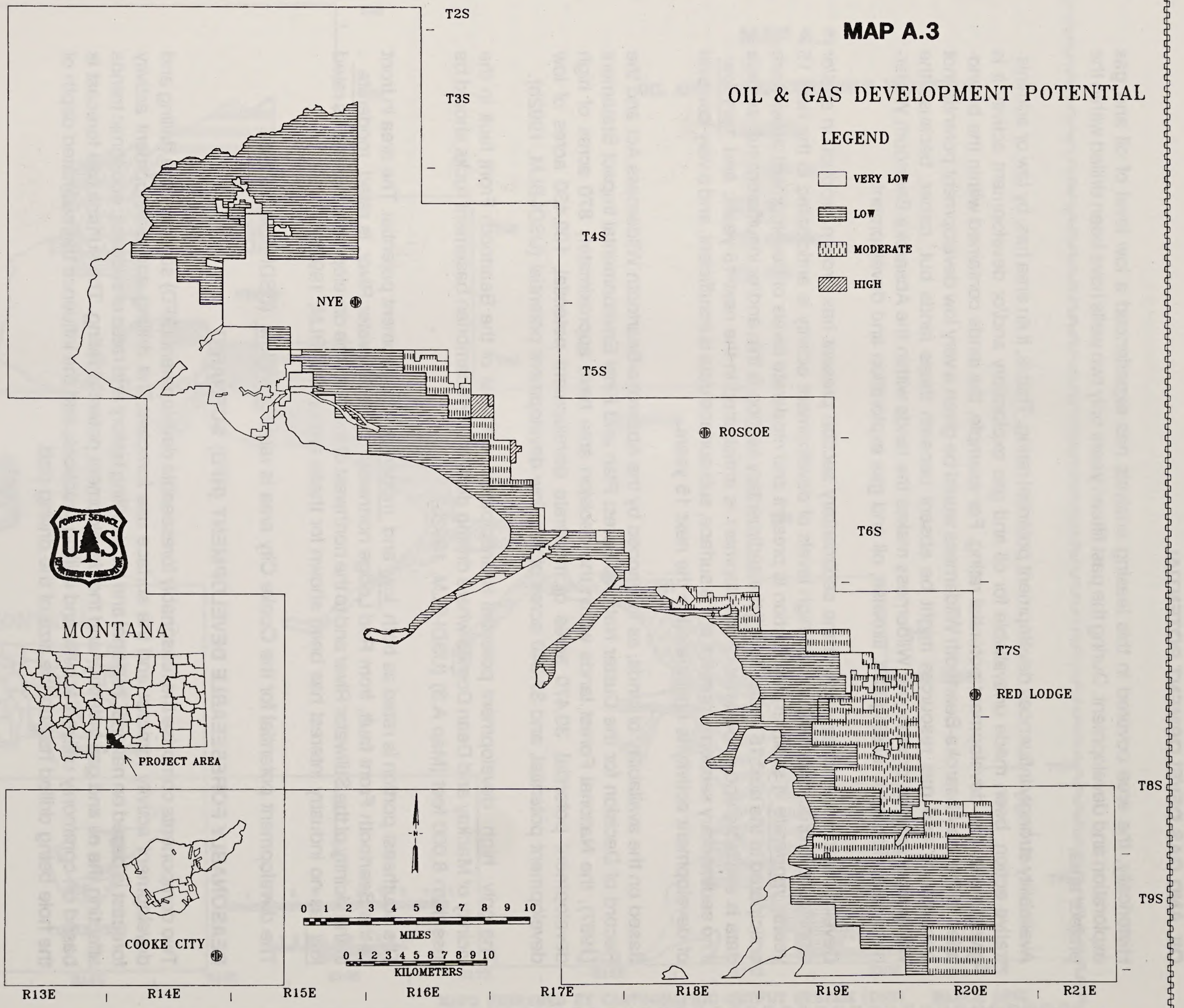
The southeast portion is rated as both low and moderate development potential. The area in front of the Beartooth Front fault, from Red Lodge northwest to the Stillwater River, is rated moderate . In the vicinity of the Stillwater River and to the northwest of the River the development potential is rated low as no industry interest has been shown for these area (USDI-BLM, 1992b).

The development potential for the Cooke City area is rated very low (USDI-BLM, 1992b).

REASONABLY FORESEEABLE DEVELOPMENT (RFD) SCENARIO

Two components comprise the reasonably foreseeable development (RFD) scenario, the drilling and development activity forecast and the surface use forecast. The drilling and development activity forecast is based on national, regional and local drilling history and rates of success, economic trends affecting the oil and gas industry, and the development potential rating. The surface use forecast is based on commonly utilized access and drilling practices, and the influence the estimated depth of the hole being drilled has on the size of the drilling pad.

BEARTOOTH MOUNTAINS OIL & GAS LEASING EIS



MAPS PREPARED BY CARTOGRAPHIC OUTPUT SYSTEM (COS) MARCH 1992

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Drilling and Development Activity Forecast: Nationally, during the years 1980 through 1984, approximately 28 percent of all exploratory well sites successfully encountered oil and gas (U.S. Energy Information Administration, 1984). During the same time period, the success rate in Montana was approximately 27 percent. These statistics include all exploration well sites and probably overestimate the chance of success for a rank wildcat well. A rank wildcat well is an exploration attempt that is drilled into unknown, unexplored geologic conditions. Nationally, success rates for rank wildcat well sites are 13 percent.

The RFD forecast has changed since it's release in July, 1991 as part of the public scoping package. The July 1991 RFD was based on the assumption the exploration attempt by Phillips Petroleum Company at the Ruby A Federal 1-9 well site would result in increased exploration activity. The Ruby A well was not successful. Therefore, the RFD scenario has been modified to reflect this change. In addition, scoping comments from the oil and gas industry asserted the July 1991 RFD over estimated the amount of reasonably foreseeable development activities. The Forest Service and BLM geologists met with industry geologists and geophysicists to revise the July 1991 RFD.

Four wells are expected to be drilled on Federal leases in the next 15 years within the project area. Based on information obtained from recent drilling efforts, the Lower Cretaceous Greybull Sandstone will be the target formation for these future drilling operations. In addition, the Greybull has not produced hydrogen sulfide gas and none is foreseeable in any of the four drilling attempts (MGS, 1985, p. 442 and p. 542).

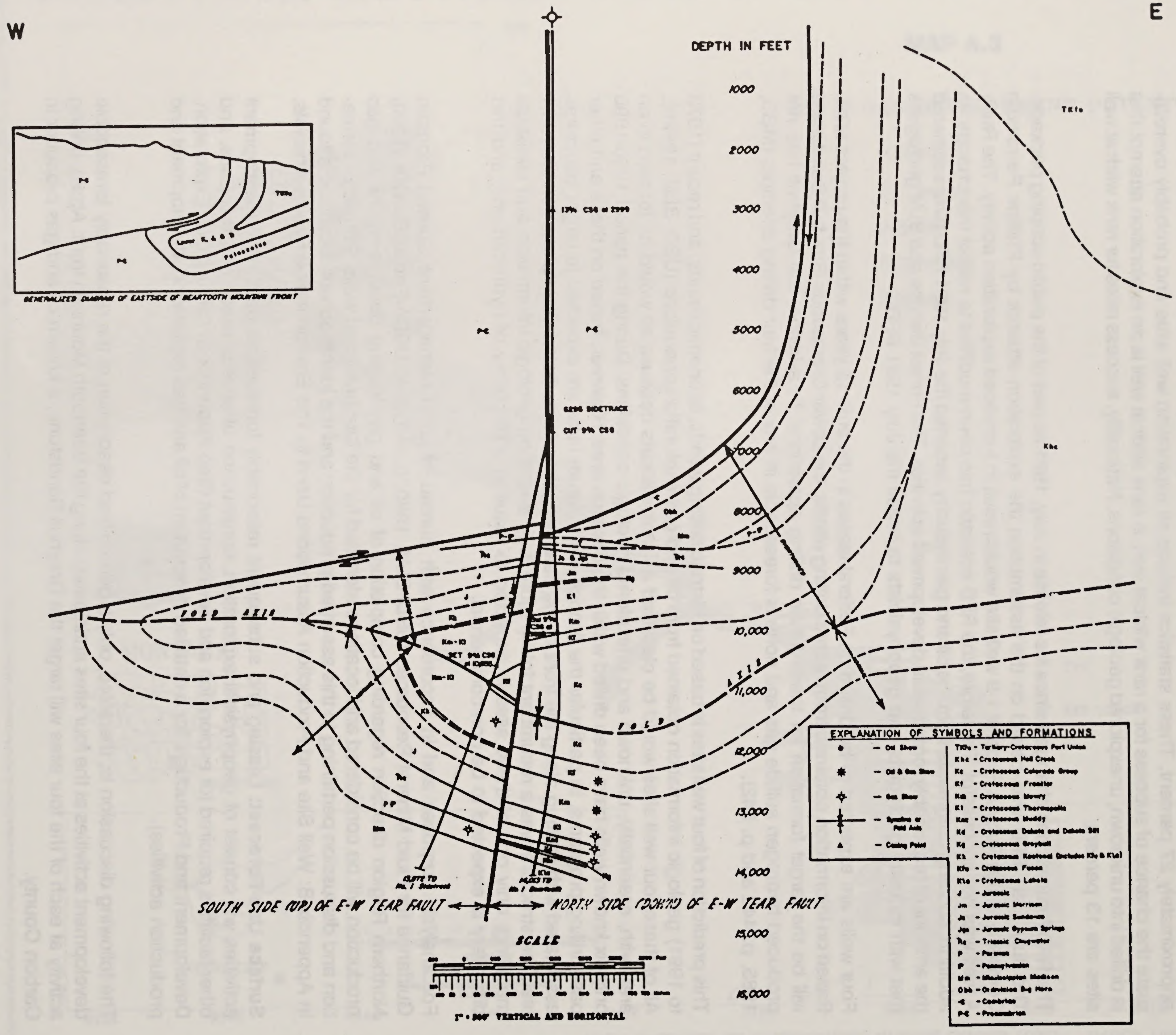
This prediction of four well sites is based on historic drilling trends, economic trends, and recent (1973 to 1991) geologic information obtained from oil and gas exploration operations (USDI-BLM, 1992b). All of these four well sites would be classified as rank wildcats because all would be located in an area with, essentially, unknown and unexplored geologic conditions. During the period 1950-1990 only six known wells have been drilled within the decision area. However, based on these and other past drilling programs, in particular the Amoco A #1, future tests are expected to target structures associated with faulting along the front of the Beartooth Mountains. In the case of the Amoco A #1 test, the structure was a recumbent fold (Figure A.2). Based on geologic information and statistical modeling, only one of these sites is expected to result in a discovery of hydrocarbons, and this discovery is expected to be non-commercial.

For analysis purposes and in accordance with Bureau of Land Management Special Program Guidance for Fluid Mineral Resources (USDI-BLM, 1990, p. III-7) and USDA-Forest Service (1990) Northern Region direction regarding completion of oil and gas leasing documents, oil and gas production will be considered and locations identified for the four predicted wells. Detailed information and discussion pertaining to this assumed production and the identified well locations is found in Appendix B: Well Site and Production Assumptions Used In The Environmental Effects Analysis.

Surface Use Forecast: Leasing and subsequent reasonably foreseeable post-lease development activities will consist of geophysical exploration, construction of access roads and drill pads, and other facilities required for exploration and development (See Appendix C: Oil And Gas Exploration, Development and Production, for a detailed description of oil and gas exploration, development and production activities).

The following discussion is, therefore, only a generalized description of the reasonably foreseeable development activities at the four sites anticipated along the Beartooth Mountain front. Again, drilling activity at each of the four sites will target the Greybull Sandstone; a known oil and gas producer in Carbon County.

FIGURE A.2



DIAGRAMMATIC SECTION THROUGH AMOCO NO. 1 BEARTOOTH UNIT

Roads are normally used for oil and gas development to allow access for drilling and ongoing operations and maintenance. Individual roads are designed and constructed to standards appropriate for the type and frequency of traffic expected. Roads that lead to well sites that are abandoned are usually closed and reclaimed. Some roads created for well site access may be retained and incorporated into the Ranger District's transportation plan.

Each well drilled requires construction of a level pad ranging in size between two to five acres. The pad serves as a staging area for setting up the rig and contains the reserve pit, storage tanks and other equipment and installations necessary for drilling. Crew quarters may also be temporarily located on the pad. When the well is completed, the portions of the pad not required for ongoing operations are re-contoured and revegetated. If the well is plugged and abandoned, the entire pad is reclaimed. In some cases a new well may be drilled on an existing pad disturbing previously reclaimed areas or delaying planned reclamation and revegetation.

Electrical power for well site operations could be provided by either a transmission line or an on-site diesel generator. As development advances, well sites often tie into existing power and pipeline systems. Based on past practices, it is anticipated that new power and pipelines would be routed along new or existing road corridors.

Where a well produces gas the gas can be piped to a central collection system, re-injected into the producing formation, or flared on-site. Flaring is often authorized while the well is being completed and until a pipeline can be connected. Produced water is normally piped to and stored in on-site tank batteries, for periodic removal by trucks, or re-injected into underground reservoirs.

Due to the unconstrained nature of this RFD drilling operations will occur year long, seven days a week, and 24 hours a day (3 shifts). In general, drilling operations with a total depth of 10,000 feet or less will employ three 1,500 horse power diesel electric motors which will use 75 gallons of diesel fuel per hour. Drilling operations with a total depth of 11,000 to 15,000 feet will require four 2,100 horse power motors which will use 100 gallons of diesel fuel per hour. Vehicle traffic will consist of shift changes and the transportation of materials and personnel to service and support the drilling operations. Reclamation activities typically utilize bulldozers, backhoes, and farm tractors to re-shape and re-vegetate disturbed areas.

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APPENDIX B

WELL SITE

AND

PRODUCTION ASSUMPTIONS

USED IN THE

ENVIRONMENTAL EFFECTS ANALYSIS

INTRODUCTION

The reasonably foreseeable development (RFD) scenario, as discussed in Appendix A, is based on past oil and gas activity, geologic potential for oil and gas occurrence, development potential, economics, and geologic factors. It is non-specific as to drilling and/or production locations. However, in order to provide a means by which the representative effects of exploration, development, and production activity at specific locations can be analyzed this section is included which identifies four well sites and the assumptions associated with potential drilling at each of these sites.

This approach follows the requirements of Bureau of Land Management Special Program Guidance for Fluid Mineral Resources (USDI-BLM, 1990) and USDA-Forest Service (1990) Northern Region direction for oil and gas leasing analysis, both of which are reflective of the analysis mandates of Conner v. Burford [848 F.2d 1441 (9th Cir. 1988)]. Special Program Guidance (USDI-BLM, 1990, p. III-7) requires that production be considered, even where no commercial/economic hydrocarbon discovery is anticipated; and Northern Region (USDA-FS, 1990, p. 15) direction requires that drill sites, based on the RFD, be located so that site specific effects of oil and gas exploration, development, and production activities can be disclosed.

Therefore, where Appendix A meets the Conner v. Burford requirement to analyze only "reasonably foreseeable" exploration, development and production, Appendix B satisfies BLM and Forest Service requirements to analyze the effects of oil and gas well drilling and production. It is important to make the distinction between these two appendices since Appendix A, by definition, is "reasonable" (based upon predictions of oil and gas occurrence and development potential) whereas Appendix B represents a more speculative analysis based on use of locations and production that may not in fact ever happen.

In addition to the information found in Appendix A, the assumptions found in Appendix B are also based on the BLM Oil and Gas Potential Report (USDI-BLM, 1992) and analogs derived from adjacent oil and gas development. While the locations are highly speculative the activities associated with oil and gas exploration, development, and production detailed in Appendix C, should remain similar throughout the project area regardless of the specific locations identified by this analysis scenario.

SITE LOCATIONS, CONSTRUCTION, DRILLING AND PRODUCTION ASSUMPTIONS

As noted in the RFD in Appendix A , four wells are expected to be drilled on Federal leases in the next 15 years within the project area. This predicted number is based on historic drilling trends and recent (1973 to 1991) geologic information obtained from prospecting operations (USDI-BLM, 1992). All of the well sites described in the RFD scenario are classified rank wildcat sites because all are located in areas of unknown, unexplored geologic conditions. All four sites occur on Federal lands along the Beartooth Mountain front (Map B.1). None of these sites are expected to result in a commercial/economic discovery of hydrocarbons.

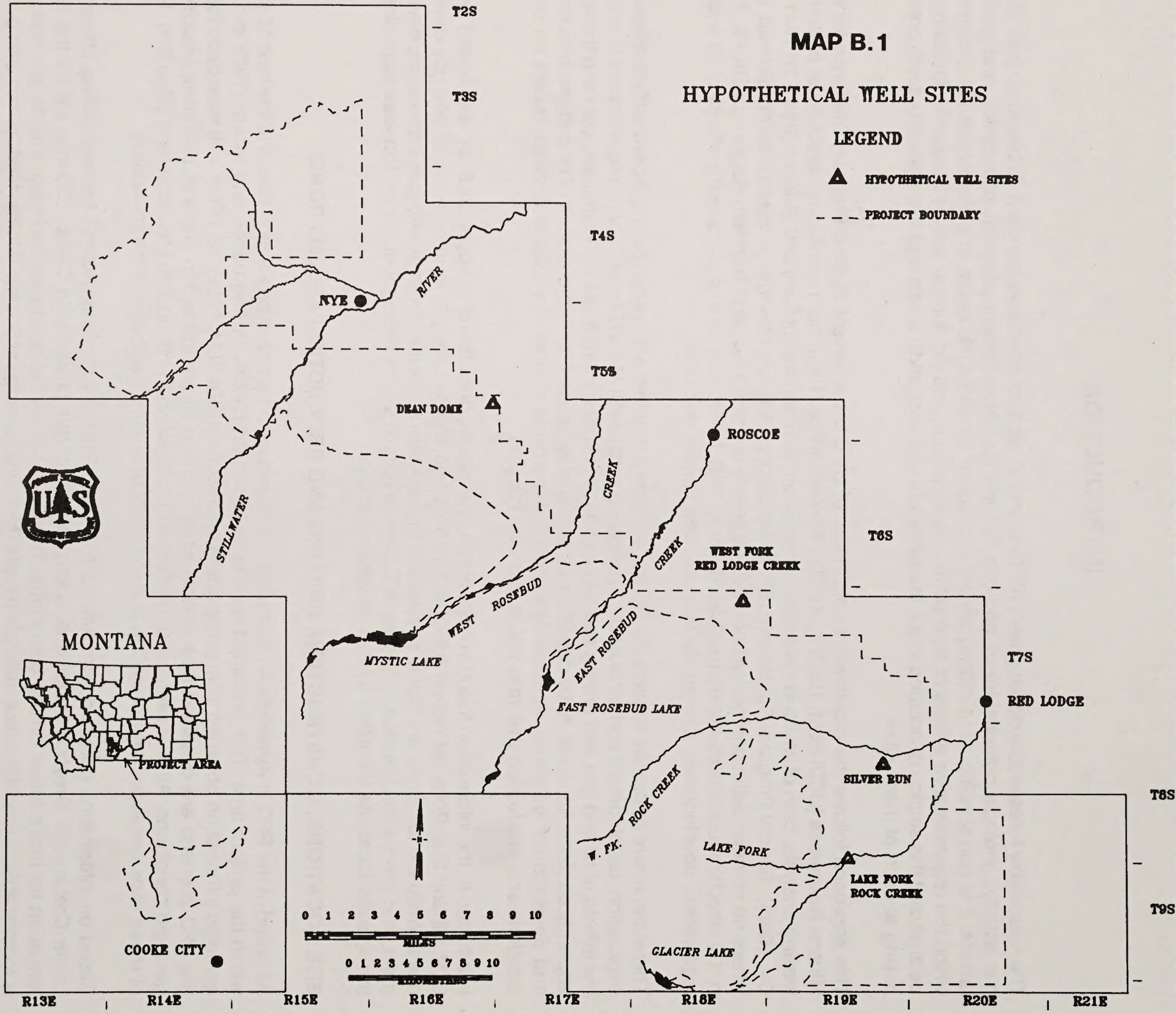
Based on information obtained from Amoco A #1 and Phillips Petroleum Ruby-A Federal drilling efforts, the Lower Cretaceous Greybull Sandstone, a known oil and gas producer in Carbon County, will be the target formation for these future drilling operations. The Greybull has not produced hydrogen sulfide gas and none is foreseeable in any of the four drilling attempts (Montana Geological Society (MGS), 1985, p. 442 and p. 542).

Selection of the locations for the four well sites utilized information from the Phillips Petroleum Ruby-A Federal and Amoco A #1 drilling efforts, published information regarding geologic settings favorable for development of an oil and gas reservoir within the project area, and discussions with industry and government petroleum geologists. Therefore, the four sites selected represent the best opportunity for success from a geologic standpoint rather than in consideration of other needs.

BEARTOOTH MOUNTAINS OIL & GAS LEASING EIS

MAP B.1

HYPOTHETICAL WELL SITES



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The Dry Creek and Dean Dome oil and gas fields were used as the exploratory and production analogs for the four sites (Photographs B.1-B.3) (MGS, 1985, pp. 441-447, and pp. 541-546; and Montana Oil and Gas Conservation Division, 1991). The Dry Creek field is approximately five miles northeast of Red Lodge, Montana, and the Dean Dome field is immediately adjacent to the Forest on the western end of the Beartooth Ranger District.

The following are descriptions of the biological and physical elements present at the well sites and the exploration, development and production activities that could reasonably be expected to occur at these four sites. See Table B.1 for a summary of the exploration, development and production assumptions used.

Dean Dome--NE1/4 NE1/4, Section 25, Township 5 South, Range 16 East; elevation 5,575 feet Map B.2). This site occurs in Management Area D-Fishtail (Photograph B.4). Fragile soils do not occur on site or access routes. The site is on a low ridge of glacial deposit material between two drainages and barely a quarter mile inside the Forest Boundary. The Existing Visual Condition is mostly natural appearing with portions of the area having been slightly altered.

The drill pad would be 800 feet away from the nearest creek, East Fork of Fishtail Creek, but the water table may be shallow in the glacial/alluvial material. The vegetative cover type is bunchgrass/forbs and the nearest riparian community, that found along the East Fork of Fishtail Creek, is approximately 700 ft away. Spotted knapweed occurs sporadically throughout this management area. There are no known threatened, endangered, or sensitive (TES) plant species.

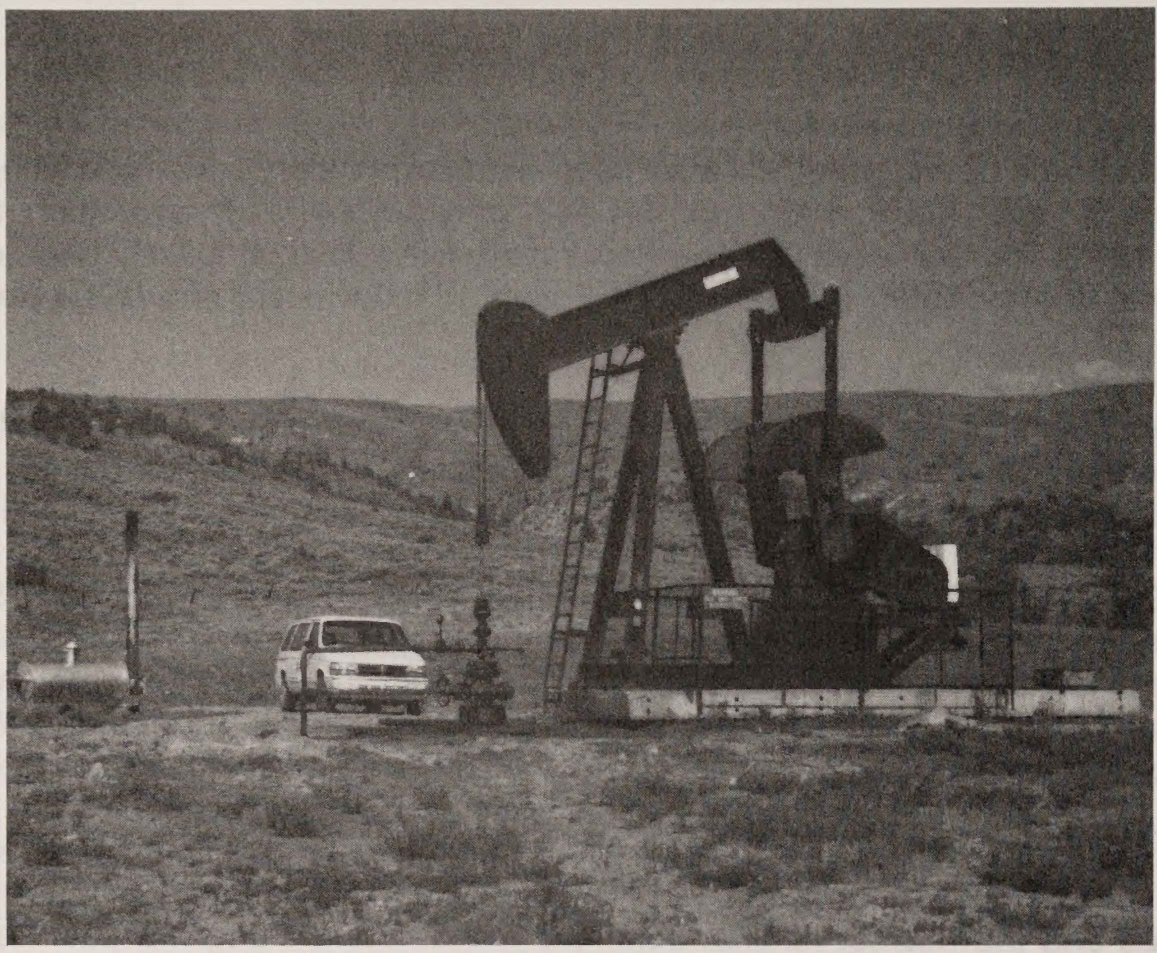
The area surrounding the Dean Dome well site provides habitat for three big game species. These include elk, moose, and bighorn sheep. However, the bighorn sheep do not inhabit areas surrounding this drill site. The Black Butte elk herd utilizes habitat in the vicinity of this drill location. During the time of elk occupation, animals are typically widely dispersed. This area is extensively used by the McDonald Basin Moose herd during all portions of the year. However, the primary season of use surrounding this location is winter/spring. Cutthroat trout are not known to occur in the streams in the vicinity of this well site.

Development includes access route construction and reconstruction, and construction of the drill pad. Development and site preparation will take 15 to 30 days. Drilling operations could take 20 days to achieve a total depth of 3,000 feet. Reclamation activities will take 10 to 15 days. Commercial/Economic production is not reasonably foreseeable at this time.

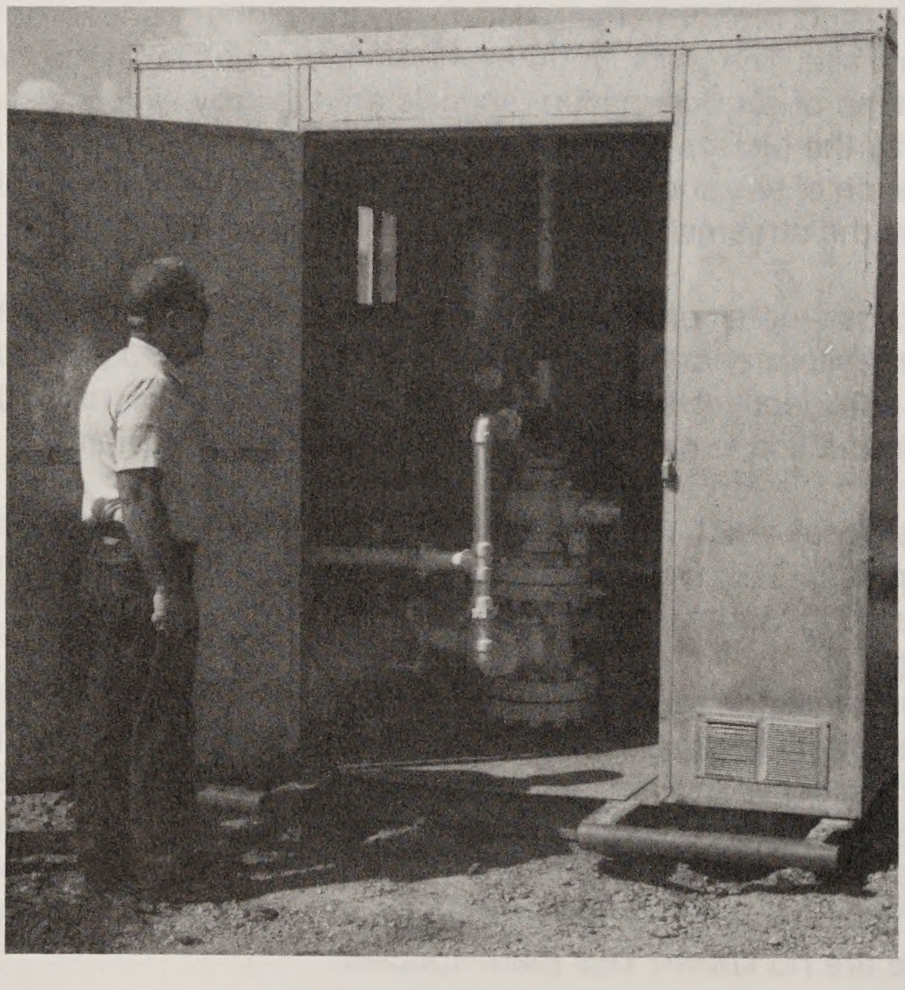
West Fork of Red Lodge Creek--NE1/4 SE1/4, Section 2, Township 7 South, Range 18 East; elevation 5,660 feet (Map B.3). This well site occurs in Management Area B-Butcher Creek (Photograph B.5). The Existing Visual Condition is slightly altered.

Fragile soils do not occur on site or access routes. This site is near West Red Lodge Creek, 1,200 feet southeast. This creek also represents the nearest riparian community. The location is on a large outwash terrace between two perennial creeks. The land is a fluvio-glacial terrace which is composed of coarse textured sands, gravels, and boulders from the original glacial till. It is also well drained although the underlying water table is likely quite shallow. The vegetative cover type is bunchgrass/forbs. Spotted knapweed occurs sporadically across the management area. There are no known TES plant species.

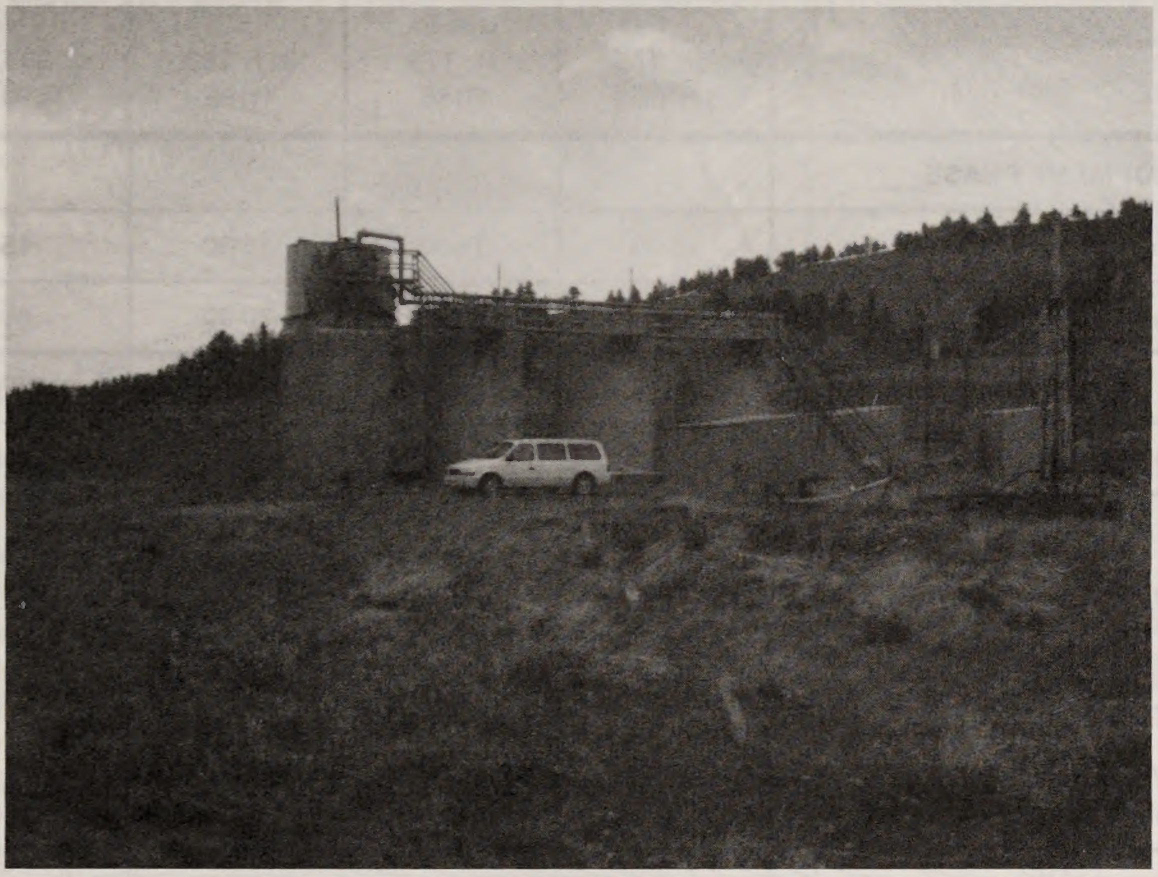
This MA supplies habitat for elk and moose; summer/fall home range for the Luther Elk herd and winter/spring range for the Red Lodge Creek Moose herd. The area also serves as a elk migration corridor between the summer/fall range and the winter/spring range. Moose use is typically restricted to aspen or shrub dominated wetland communities. Trout believed to be Yellowstone cutthroat inhabit the stream adjacent to this drill location (East Fork of the West Fork Red Lodge Creek).



Photograph B.1. Pump jack and treater, Dry Creek Field, Carbon County. Forest Service photograph; May 8, 1992.



Photograph B.2. Gas wellhead and housing structure. Dry Creek Field, Carbon County. Forest Service photograph; May 8, 1992.



Photograph B.3. Well site and tank battery, Dean Dome Field, Stillwater County. Forest Service photograph; May 8, 1992.

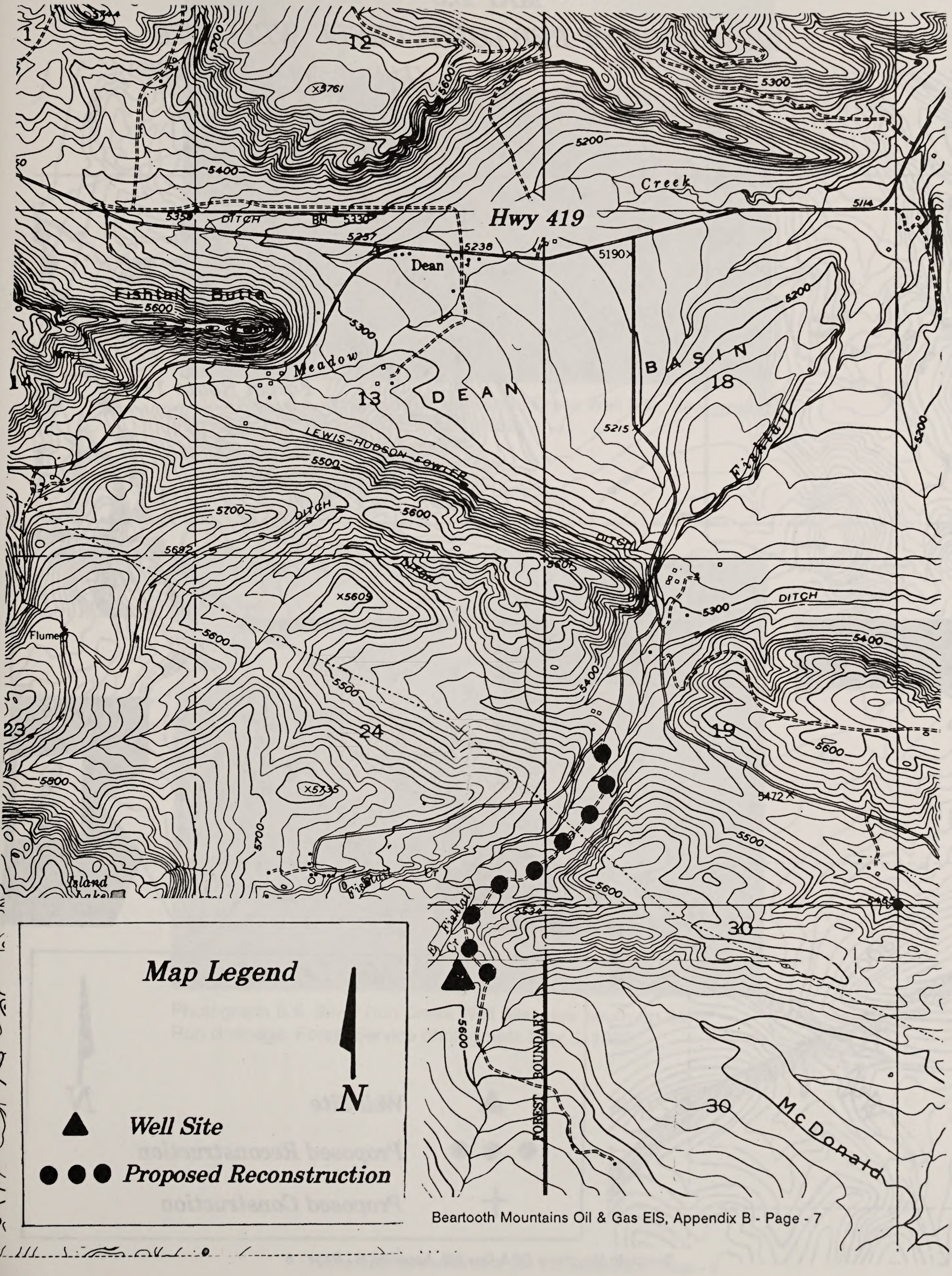
Photograph B.4. View north across Dean Dome Well Site. Forest Service photograph; February 27, 1992.

TABLE B.1
Summary of Well Site and Production Assumptions

	DEAN DOME S25, T5S, R16E	WEST FORK RED LODGE CREEK S1, T7S, R18E	SILVER RUN CREEK S11, T8S, R19E	LAKE FORK OF ROCK CREEK S33,T8S, R19E
DRILLING-DEVELOPMENT PHASE				
Site preparation work (days)	15-30	15-30	15-30	15-30
Drilling phase (days)	20	60-70	70-90	60-70
Target formation	Greybull	Greybull	Greybull	Greybull
Presence of H_2S gas	NO	NO	NO	NO
Drill rig				
Horsepower	1,500	1,500	2,100	1,500
Number of motors	3	3	4	3
Fuel type	Diesel	Diesel	Diesel	Diesel
Fuel consumption/hour	75	75	100	75
Vehicle Travel				
Two-way (trips/day)	12	12	12	12
Average (vehicles/day)	6	6	6	6
Roads				
New construction (miles)	0.1	0.2	0.05	0.0
Reconstruction (miles)	2.5	1.25	0.75	0.25
Elevation of well site (feet)	5,575	5,560	6,795	6,740
Depth of hole (feet)	3,000	10,000	11,500	9,700
PRODUCTION PHASE				
Natural gas per day (MCF)	N/A	200	N/A	N/A
Natural gas per year (MCF)	N/A	72,000	N/A	N/A
Oil per day (barrels)	N/A	20	N/A	N/A
Oil per year (barrels)	N/A	7,200	N/A	N/A
Produced water salt content (PPM)	N/A	5,000	N/A	N/A
Vehicle travel				
Maintenance (trips/day)	N/A	1	N/A	N/A
Oil product removal (trips/week)	N/A	1	N/A	N/A
Work-over rig duration & frequency	N/A	½ day/ month	N/A	N/A
SITE RECLAMATION WORK (days)	10-15	10-15	10-15	10-15

N/A=Not Applicable, because of no production.

MAP B.2
DEAN DOME WELL SITE

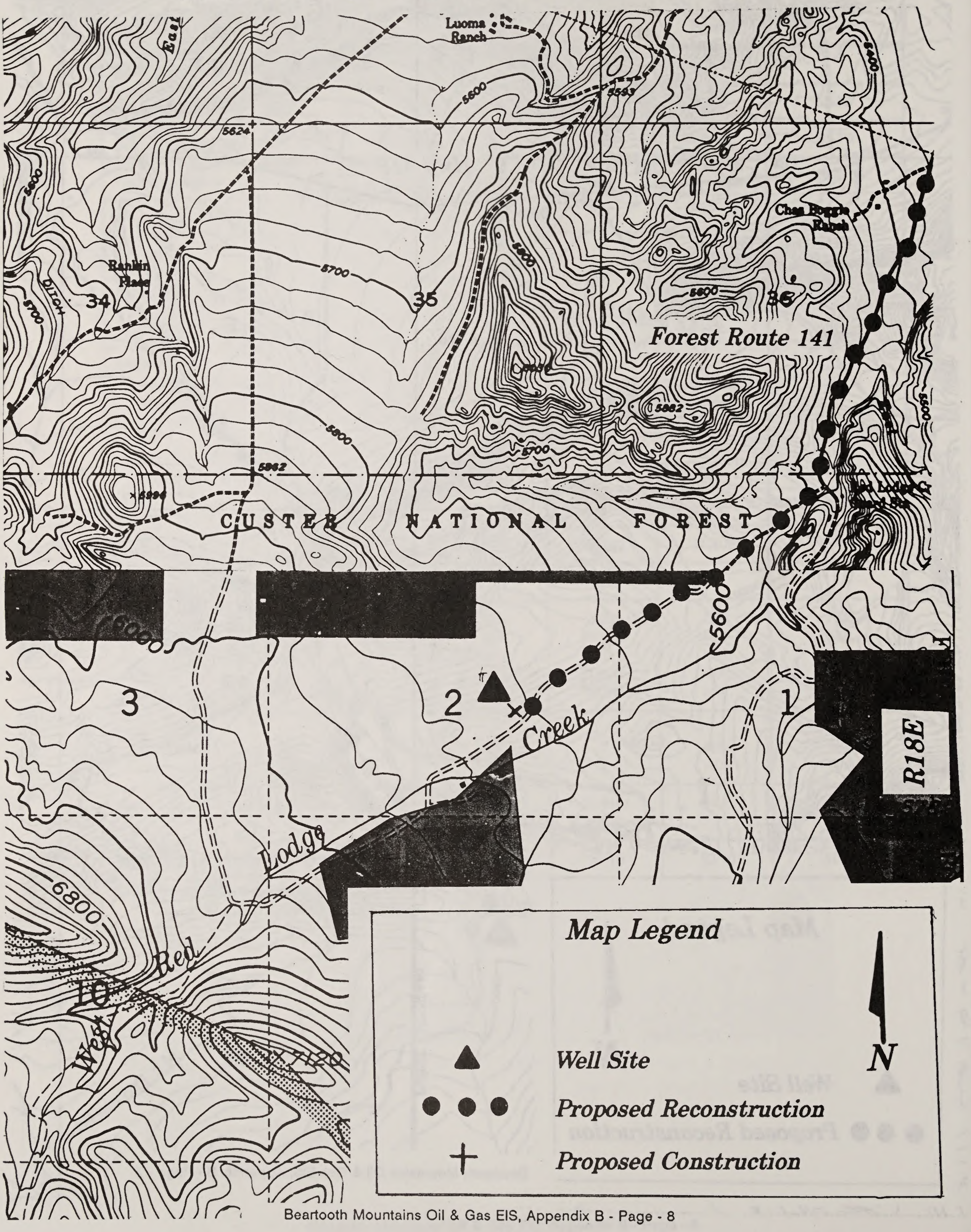


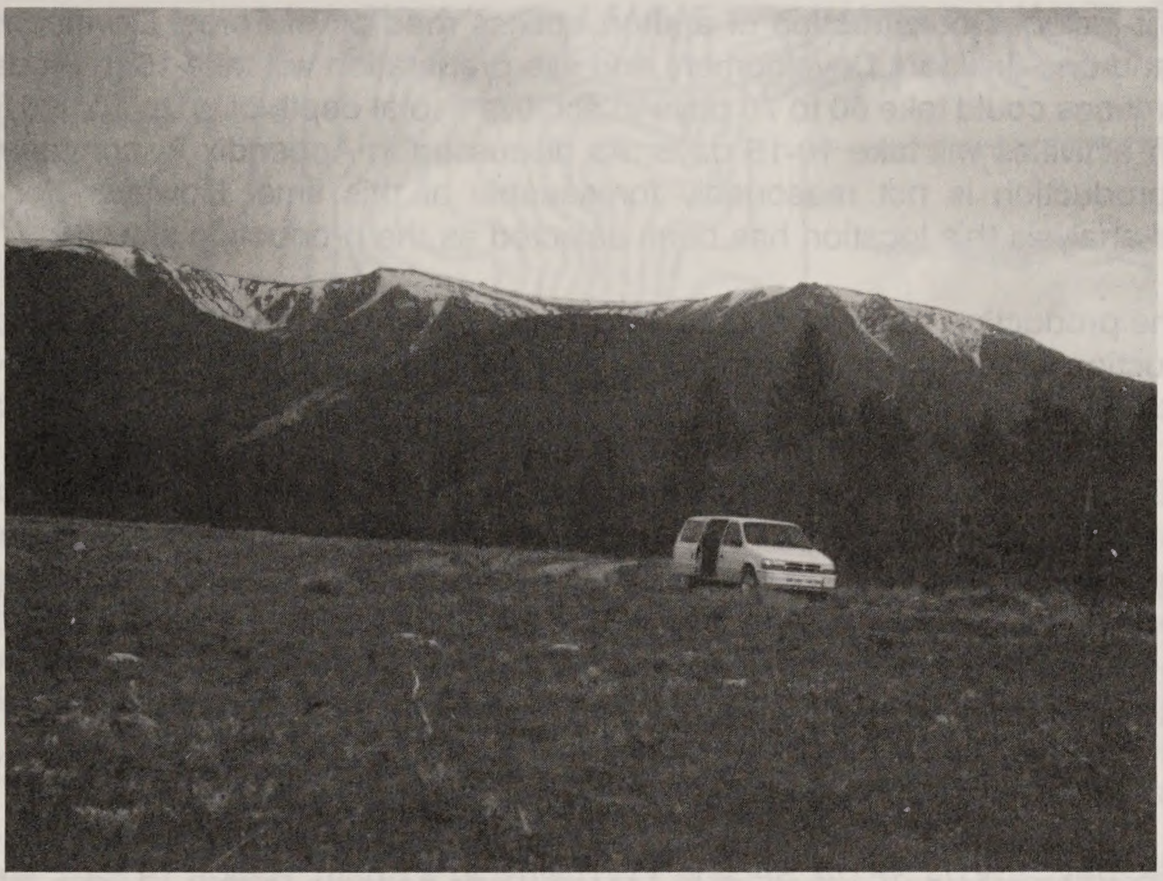
Map Legend

▲ Well Site

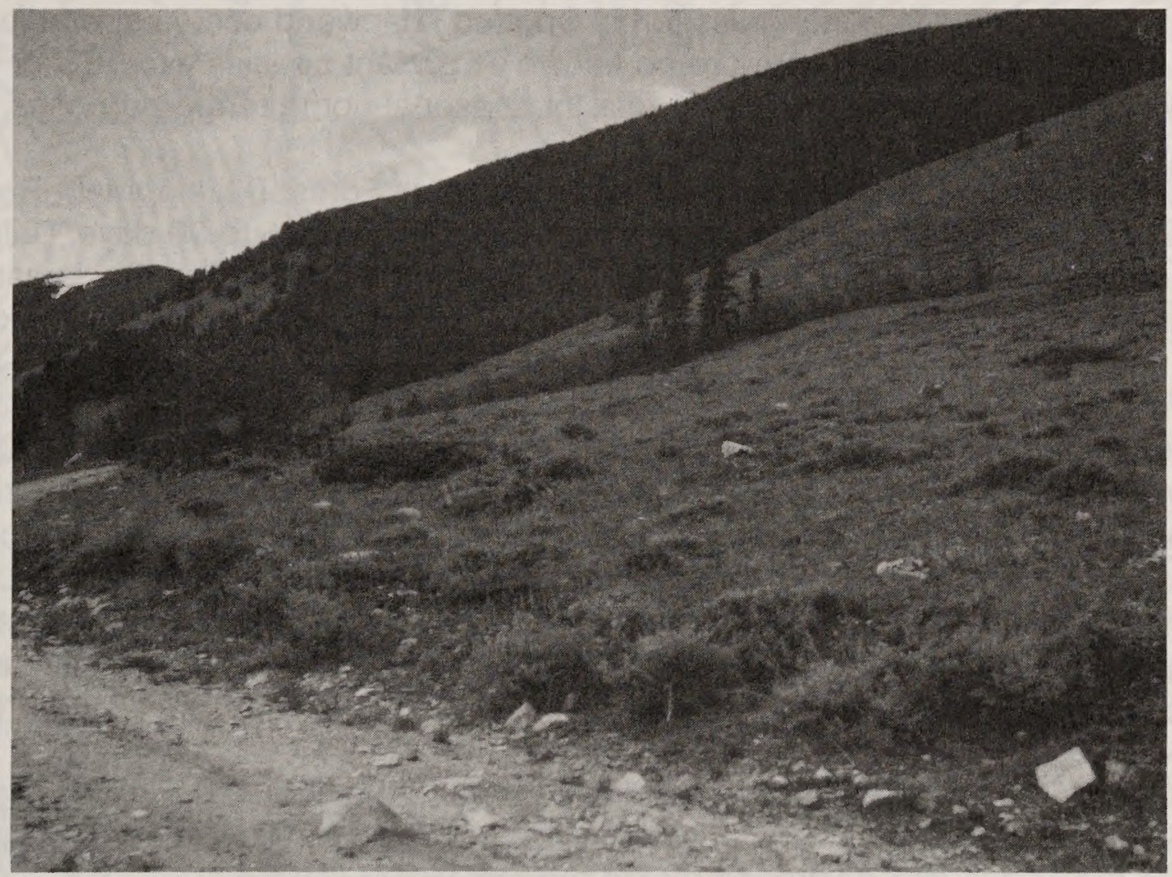
● ● ● Proposed Reconstruction

MAP B.3
WEST FORK OF RED LODGE CREEK WELL SITE





Photograph B.5. West Fork of Red Lodge Creek Well Site, view west. Forest Service photograph; May 8, 1992.



Photograph B.6. Silver Run Creek Well Site, view south up Silver Run drainage. Forest Service photograph; May 8, 1992.

Development includes construction of a short access road off of Forest Development Route 141 and one drill pad. Development and site preparation will take 15 to 30 days. Drilling operations could take 60 to 70 days to achieve a total depth of up to 10,000 feet. Reclamation activities will take 10-15 days. As discussed in Appendix A, commercial/ economic production is not reasonably foreseeable at this time. However, for the purposes of analysis this location has been selected as the production site.

Based on the production histories of the nearby Dry Creek and Dean Dome oil and gas fields, production will occur for 10 years at an average rate of 200,000 cubic feet of gas per day and 20 barrels of oil (condensate) per day (using a cubic feet of gas to condensate ratio of 10,000:1). The 10-year cumulative production would, therefore, be 720,000,000 cubic feet of gas and 72,000 barrels of oil. The oil condensate will be stored at an on-site tank battery and removed by truck every seven days to one of the refineries in the Billings-Laurel area. A maintenance worker/well checker will have to visit the site on an average of once per day; normally, in a 1/2 or 3/4-ton pickup. A one-ton work-over rig will have to visit the site at least once a month for 1/2 day to remove paraffin scale (wax) build up in the well bore. The methane gas could be used onsite to power the production systems and/or removed by pipeline, or flared if there is no nearby pipeline. Again, no sour gas (methane with hydrogen sulfide) is anticipated.

Silver Run Creek--NW1/4 SE1/4, Section 11, Township 8 South, Range 19 East; elevation 6,795 feet (Map B.4). This site occurs in Management Area R-West Fork of Rock Creek (Photograph B.6). Fragile soils do not occur at the well site or along the access routes. Silver Run Creek is 300 feet to the east of the well site, which is also the nearest riparian habitat. If the well site is constructed on the hillside, material is residual but if in the edge of the valley bottom, it would be on coarse textured alluvial material. For this portion of Management Area R the Existing Visual Condition is mostly natural appearing.

The vegetative cover type is bunchgrass/forbs. Spotted knapweed occurs sporadically across the management area. There are no known TES plant species. No TES or big game wildlife species regularly utilize this area for seasonal home range purposes.

Development includes reconstruction of an access road off Forest Development Route 71 and one drill pad. Development and site preparation will take 15 to 30 days. Drilling operations could take 70 to 90 days to a achieve a total depth of 11,500 feet. Reclamation activities will take 10-15 days. Commercial/Economic production is not reasonably foreseeable at this time.

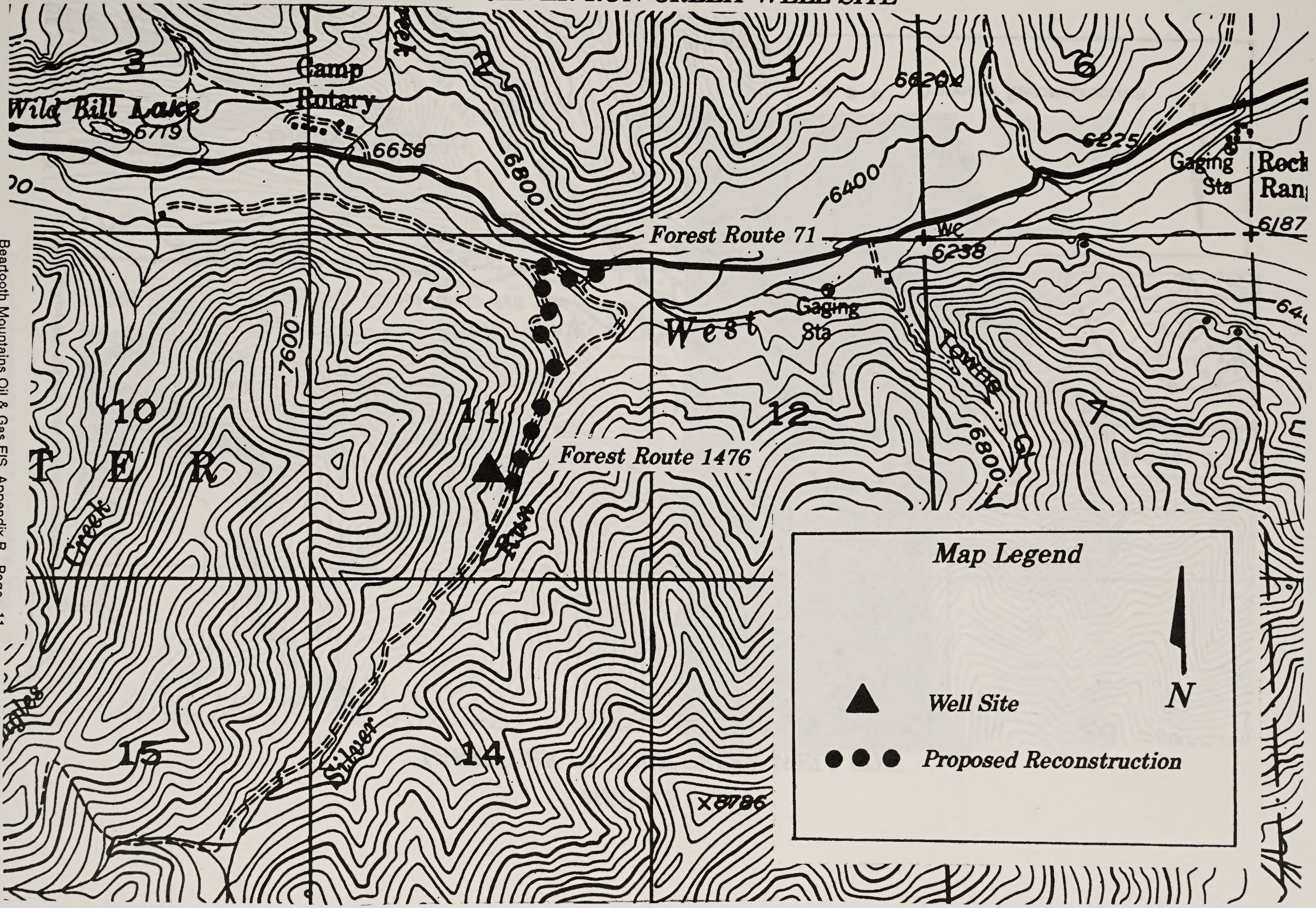
Lake Fork of Rock Creek--SE1/4 SE1/4, Section 33, Township 8 South, Range 19 East; elevation 6,740 feet (Map B.5). This site occurs in Management Area F-Rock Creek (Photograph B.7). Fragile soils do not occur at the well site or along the site or access route. This site is located on a stream terrace situated between the confluence of the Lake Fork and the Main Fork of Rock Creek. The substrate of the site is composed of coarse textured glacial outwash material and should have a shallow water table near the same level as water in the adjacent streams.

The Lions Camp lies about 0.25 mile immediately west of the site. The Existing Visual Condition is heavily altered. In fact, this site was once occupied by Richel Lodge, a guest lodge built in the 1920s and destroyed by fire around 1970.

The vegetative cover type is bunchgrass/forbs and, from the well site, the nearest riparian communities are about 300 feet. Spotted knapweed occurs sporadically across the management area. There are no known TES plant species.

This area is not regularly used by TES or big game wildlife. However, the portion of Rock Creek which lies adjacent to this well site supports a population of cutthroat trout which may include the Yellowstone sub-species.

MAP B.4
SILVER RUN CREEK WELL SITE



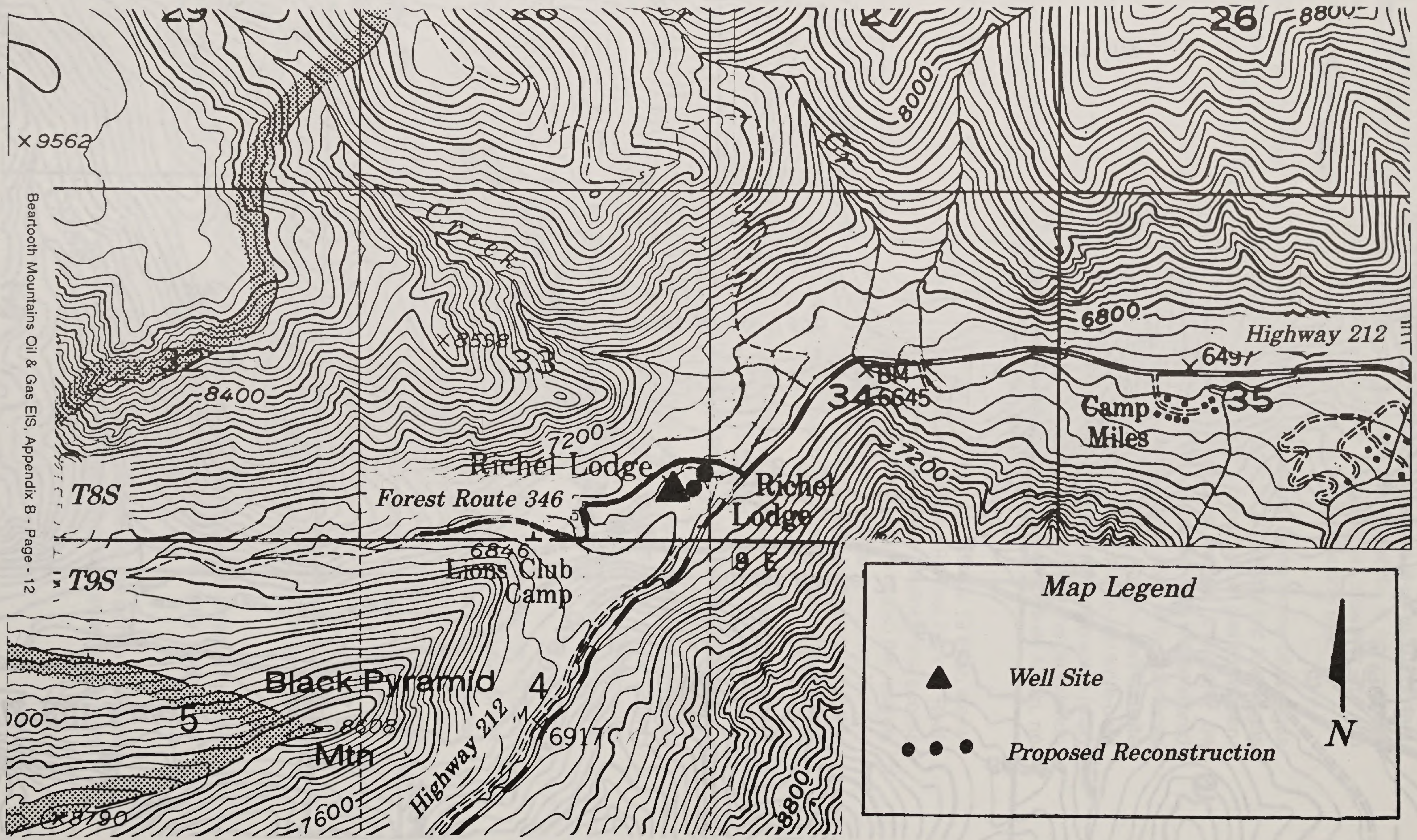
Map Legend

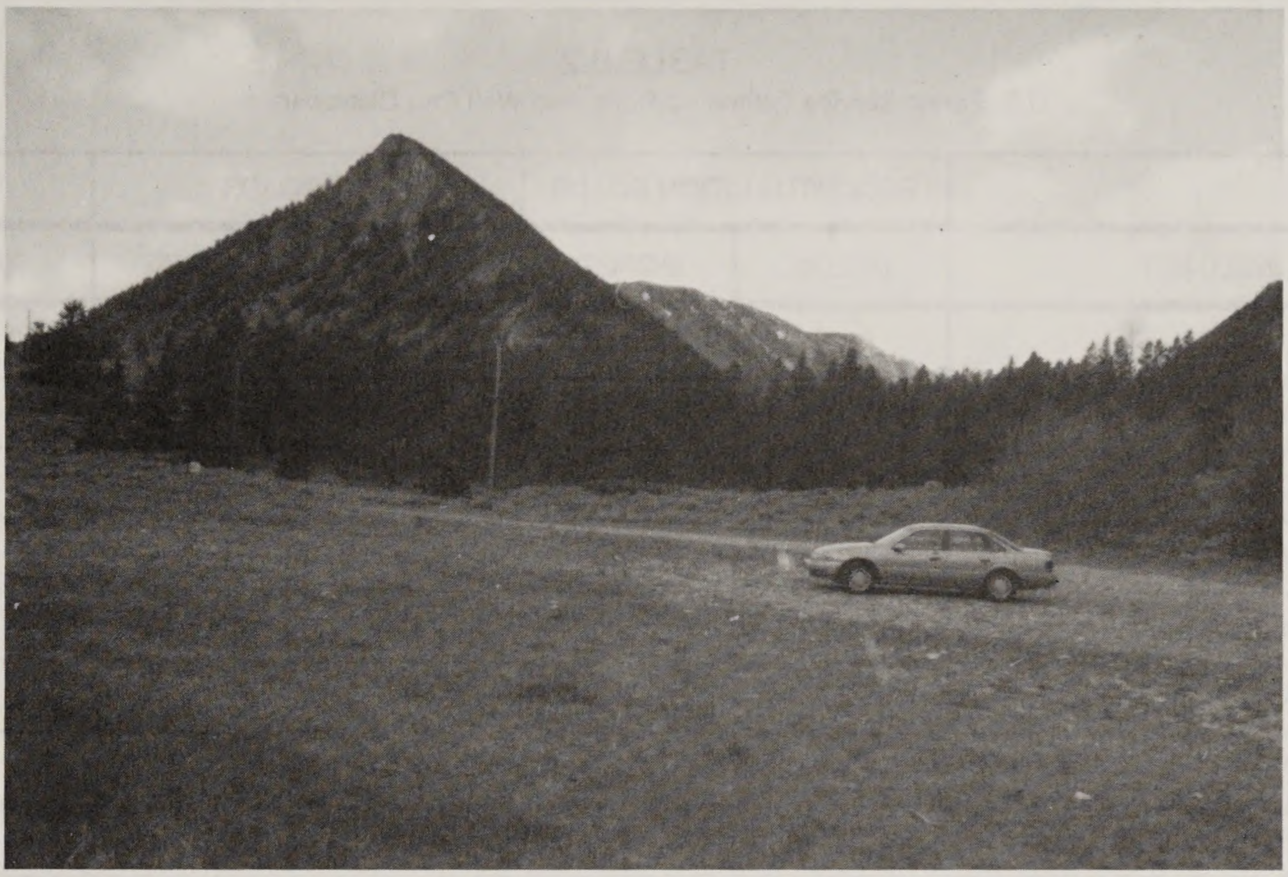
▲ Well Site

● ● ● Proposed Reconstruction

MAP B.5

LAKE FORK OF ROCK CREEK WELL SITE





Photograph B.7. Lake Fork of Rock Creek Well Site, view west toward Black Pyramid Mountain. Forest Service photograph; May 10, 1992.

Development includes construction of a short access road off Forest Development Route 346 and one drill pad. Development and site preparation will take 15 to 30 days. Drilling operations could take 60 to 70 days to achieve a total depth of 9,700 feet. Reclamation activities will take 10-15 days. Commercial/Economic production is not reasonably foreseeable at this time.

Table B.2 displays the estimated miles of road reconstruction and new road construction and the acres disturbed by construction of new roads and drill pads.

TABLE B.2

U.S. Forest Service Estimated Road and Well Pad Disturbance

	RECONSTRUCTION ROADS		NEW ROADS		PADS
WELL SITE	(MILES)	(ACRES)	(MILES)	(ACRES)	(ACRES)
Dean Dome	2.5	20.0	0.1	0.8	2.5
W. Fork of Red Lodge Creek	1.2	9.6	0.2	1.6	2.5
Silver Run Creek	0.75	6.0	0.05	0.4	3.0
Lake Fork of Rock Creek	0.25	2.0	0.0	0.0	3.0
TOTAL MILES	**4.7**		**0.35**		
TOTAL ACRES		37.6		**2.8**	**11.0**
TOTAL ACRES OF DISTURBANCE = 51.4					

TABLE I is based on the assumption of 8 acres of disturbance per one mile of single lane road.

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APPENDIX C

Oil and Gas Exploration, Development and Production

The following description of oil and gas activities is a general coverage of the topic provided for the readers benefit. It is basically a primer on the subject. It is not intended to represent what would happen if oil and gas development should occur in the study area covered by this EIS. If leasing occurs, some or all of the phases and activities described may or may not occur, and if they do, some combination of the activities described for each phase and activities will also occur. New technologies are coming on line continuously and some of the activities described may change or be replaced by the new technology. hopefully, this section will give the reader that has not been exposed to oil and gas activities at least a basic understanding of the complexity of the subject and an appreciation for the difficulty in analyzing a subsurface resource.

APPENDIX C

Oil and Gas Exploration, Development, and Production

TABLE OF CONTENTS

Page

Assumptions . . . . C - 1

A. Preliminary Investigations (Phase 1) . . . . C - 1
  1. Permitting Process . . . . C - 1
  2. Geologic and Remote Investigations (Surveys) . . . . C - 3
  3. Seismic Reflection Surveys (Geophysical Exploration) . . . . C - 4
  4. Post-Lease Preliminary Investigations . . . . C - 4

B. Exploratory Drilling (Phase 2) . . . . C - 5
  1. Permitting Process . . . . C - 5
  2. Oil and Gas Exploratory Units . . . . C - 6
  3. Stratigraphic Tests . . . . C - 6
  4. Wildcat Wells . . . . C - 6
  5. Directional Drilling . . . . C - 11
  6. Oil and Gas Discovery . . . . C - 12

C. Field Development (Phase 3) . . . . C - 14
  1. Approval of Field Development Plans . . . . C - 14
  2. Well Spacing Pattern . . . . C - 14
  3. Unitization . . . . C - 14
  4. Drilling Procedures . . . . C - 15
  5. Surface Use Requirements . . . . C - 15
  6. Surface Use and Construction Standards . . . . C - 15
  7. Oil Field Production Development . . . . C - 18
  8. Gas Field Production Development . . . . C - 18
  9. Rate of Development . . . . C - 18
  10. Protective Drilling . . . . C - 19
  11. Pool Discoveries . . . . C - 19

Page

D. Production (Phase 4) . . . . C - 19
  1. Well Completion Report . . . . C - 19
  2. Well Completions . . . . C - 20
  3. Well Stimulation . . . . C - 20
  4. Oil Wells - Wellhead Facilities . . . . C - 21
  5. Gas Wells . . . . C - 22
  6. Oil Field Gathering Systems . . . . C - 25
  7. Gas Field Gathering Systems . . . . C - 25
  8. Oil and Gas Separating, Treating, and Storage Facilities . . . . C - 25
  9. Disposal of Produced Water . . . . C - 26
  10. Secondary and Enhanced Recovery of Oil . . . . C - 29
  11. Transportation Pipelines . . . . C - 30
  12. Well Servicing and Oil and Gas Field Maintenance . . . . C - 31
  13. Pollution Control . . . . C - 31
  14. Inspection and Enforcement . . . . C - 32

E. Abandonment (Phase 5) . . . . C - 32
  1. Approval of Abandonment . . . . C - 32
  2. Inspection and Final Abandonment Approval . . . . C - 35
  3. Release of Bonds . . . . C - 35

LIST OF FIGURES

Page

Figure 1 Sequence of Operations in an Oil and Gas Field . . . . C - 2
Figure 2 Wellsite Location Layout . . . . C - 9
Figure 3 Blow Out Preventer (Three Preventer Stack) . . . . C - 10
Figure 4 Horizontal Oil Well Drilling . . . . C - 13
Figure 5 A Wellhead . . . . C - 23
Figure 6 Sucker Rod Pump Unit . . . . C - 24
Figure 7 Vertical Heater - Treater . . . . C - 27
Figure 8 Cutaway of Horizontal Separator . . . . C - 28

APPENDIX C

Oil and Gas Exploration, Development, and Production

ASSUMPTIONS:

Once an oil and gas lease is issued, the lessee or his designated operator may enter upon the leasehold to conduct oil and gas operations unless otherwise limited by special stipulations. The following depicts what can be expected to occur and, therefore, assumed will occur for the purposes of this analysis when oil and gas is discovered and development of a lease is undertaken. It is also assumed that the technology of oil and gas exploration and development will not change significantly during the life of this document. This section is an integral part of the assumptions made in Chapter 2.

Successful oil and gas exploration and development generally progresses through five basic operational phases. These include: (1) preliminary investigation (includes geophysical exploration), (2) exploratory drilling, (3) development, (4) production, and (5) abandonment (See Figure 1). Several operational phases can occur in the same area at the same time. One company may drill an exploratory well on a lease while nearby another company conducts preliminary investigations. However, if only one company is conducting operations in an area, normally only one phase of the operation will take place at a time. A lapse of several months or perhaps years may occur between the preliminary investigation and exploratory drilling phases. A lapse of several weeks or months may also occur between the exploratory drilling and development phases. The development and production phases may occur simultaneously, especially if a large field has been discovered. On an average, only one out of 10 wildcat (exploratory) wells drilled in the United States is successful.

It may take several years to determine whether an exploratory well is a financial success. If it is a success, the operations progress through the three remaining phases over a timespan ranging up to 50 years.

The lapse time between the production and abandonment phases of a field may be 15 to 20 years. If geophysical exploration and/or exploratory drilling are unsuccessful in the discovery of a commercial deposit of oil and gas, operations are terminated and abandonment is initiated. The operation may also go directly from development to abandonment if one or more of the development wells is unsuccessful.

A. PRELIMINARY INVESTIGATIONS (PHASE 1)

Indications of the presence of oil and gas can be obtained by exploration methods such as remote sensing and the mapping of rock outcrops and seeps. In many cases indirect methods, such as seismic, gravity, and magnetic surveys are used to delineate subsurface features which may contain oil and gas.

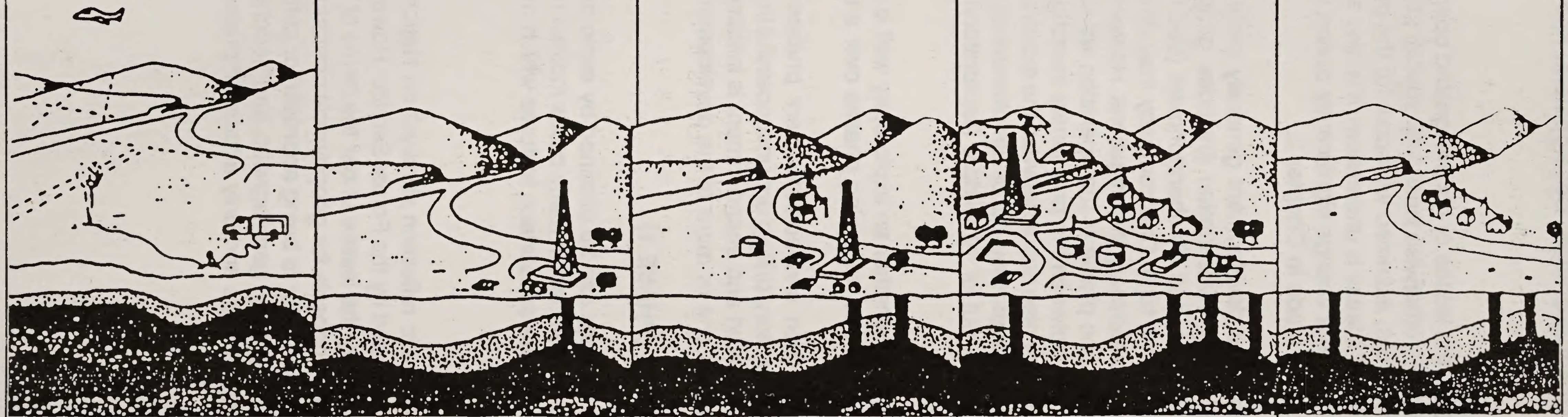
1. Permitting Process

Geophysical exploration (seismic reflection surveys) on National Forest System lands is authorized under a prospecting permit issued by the Forest Service. However, geophysical operations within the leasehold may be conducted by the lessee under the terms of the oil and gas lease without a Forest Service prospecting permit. Proposals for geophysical operations on and off an oil and gas lease are examined by the Forest Service prior to being approved or authorized. Most casual use investigation methods, such as geological, gravity, geomagnetic, and geochemical surveys do not require a permit since no surface disturbance occurs and only a "casual" presence on the land surface is required to conduct the operations.

FIGURE 1

SEQUENCE OF OPERATIONS IN AN OIL AND GAS FIELD

PRELIMINARY INVESTIGATION	EXPLORATION	DEVELOPMENT	PRODUCTION	ABANDONMENT
(Unknown Geologic Structure) Preliminary Investigations are carried out over large areas from aircraft and on the ground.	If the preliminary investigations indicate geologic structures may contain oil and gas, a lease is obtained and an exploratory well is drilled.	If oil and gas are discovered during the exploration phase and recovery is economically feasible, the field is developed for production.	The production phase involves operation and maintenance of the field and recovery of oil and gas.	**When the field is abandoned, equipment is removed, wells are plugged, and the surface is reclaimed.**



Airborne Surveys Surface Surveys Geochemical Surveys Stratigraphic & Other Mapping Explosive Method Thumper Method Vibrator Method Gravity & Other Method Geologic Survey	Wildcat Well Drilling Access Roads Camp & Buildings (Remote Areas) Geophysical Surveys	Development Drilling Access Roads Pipelines Utility Lines Seperators Storage Tanks Camps & Buildings	Continued Drilling & Development of Field Pressure Maintenance System Disposal of Waste Secondary & Tertiary Recovery Systems Communications & Production System Communities	Equipment, Buildings & Facilities Removal Field Cleanup Well Abandonment & Plugging Eliminate Hazard Surface Reclamation Landscaping Reseeding Other Erosion Control

Source: BLM 1986, Pinedale RMP

In order to secure a permit for operations on National Forest System lands, the geophysical operator is required to file, in person or by mail, an application for a prospecting permit. The application must describe the proposed activities in detail and include a map showing access routes and location of exploration activities. Upon receipt of the application, the Forest Service reviews the proposed activities to determine the stipulations necessary to protect surface uses and resources. After the Forest Service reviews the application, a permit is prepared. The operator is sent the prospecting permit indicating the stipulations, fee to be paid (if applicable), and amount of bond required. The operator must sign and return the permit with fee and bond required prior to receiving a permit. A permit is not required for casual use investigations.

The operator must receive approval of a prospecting permit prior to initiating operations outside a lease. The operator must also notify the Forest Service of the scheduled entry onto the land, must comply with all stipulations, and receive prior approval of any changes in the original plans. A prework conference and a cultural resources survey may be required prior to undertaking surface disturbing activities. Compliance inspections are conducted by the Forest Service during exploration operations to ensure compliance with the permit and to prevent unnecessary damage to the surface resources.

The geophysical operator is required to notify the Forest Service when operations are completed. The Forest Service conducts a final inspection prior to approval of termination of the permit and release of the bond.

2. Geologic and Remote Investigations (Surveys)

Geologic investigation begins with a review of geologic and technical data available for the area of interest. If the data indicates a potential for oil and gas, information for specific areas or trends are evaluated. If the area does not have a producing history and no previous wildcat wells have been drilled, an extensive geophysical exploration program covering a large area may be undertaken to collect the subsurface data in order to evaluate the oil and gas producing potential.

Remote investigations may be conducted either from the air or on the ground. These are preliminary investigations which involve only casual use and no permits are required. However, the investigators must comply with the Forest Service rules and regulations. The oil and gas lease does not grant an exclusive right to conduct remote investigations and geophysical exploration. These activities may be conducted prior to, or after, leasing by either the lessee or someone other than the lessee. These investigations may result in an expression of interest to lease specific areas.

Geological Surveys - Geological surveys normally are a casual use. Rock outcrops and topography are examined to determine the structural attitude and age of surface formation and surface maps are prepared. In some areas, sufficient information may be obtained to enable the geologist to recommend a drilling location without conducting additional exploration work.

Geochemical and Soil-gas Surveys - Geochemical and soil-gas surveys involve casual use of the land. In geochemical surveys, the chemical contents of water, soil, or vegetative samples are analyzed for the minute presence of oil or gas.

Gravity Surveys - Gravitational prospecting is a casual use to detect microvariations in gravity caused by the differences in the density of various rock types. The instrument used for gravity surveys is a small portable device called a gravimeter which can be carried by an individual. There is little surface disturbance associated with gravity prospecting except that which may be caused by off-road vehicle (ORV) use to transport equipment.

Geomagnetic Surveys - Magnetic prospecting is used to a limited extent in oil and gas exploration. Magnetic surveyors use an instrument called a magnetometer to detect small magnetic anomalies in the earth's crust. Most magnetic surveys are conducted from the air by suspending a magnetometer under an airplane. This is a casual use. There is no surface disturbance from magnetic survey operations.

3. Seismic Reflection Surveys (Geophysical Exploration)

Seismic prospecting is the most common indirect method used for locating subsurface structures which may contain oil and gas. Shock waves are induced into the earth using one of several methods. These waves travel downward and outward encountering various strata, each having a different seismic velocity. Sensing devices called geophones are placed on the surface to detect these reflections. The geophones are connected to a data recorder which stores the data. The time required for the shock waves to travel from the seismic energy source down to a given reflector (a change in rock strata) and back to the geophone can be correlated to the depth of the reflector. At the present time, vibroseis and drilling/explosive are the two most commonly used geophysical exploration methods.

Vibroseis Surveys - The thumper and vibrator methods pound or vibrate the earth to create the shock wave. Usually four large trucks, each equipped with vibrator pads (about 4-foot square), are used. The pads are lowered to the ground and vibrators on all trucks are turned on simultaneously. Information is recorded, the trucks are moved forward a short distance, and the process is repeated. Except where an access trail may be constructed or cross-country travel is necessary, surface disturbance is usually minimal since little surface area or disturbance is required to operate the equipment at each test site.

Drilling/Explosives - The drilling method utilizes truck-mounted drills which drill small-diameter holes to depths of 100 to 200 feet. Four to twelve holes are drilled per mile of line. Usually, a 50-pound charge of explosives is placed in the hole, covered, and detonated. The explosion sends energy waves which are reflected back to the surface from subsurface rock layers. The holes are drilled along a line that can be miles in length. In rugged topography, inaccessible to wheeled vehicles, a portable drill may be transported by helicopter. A typical drilling seismic operation may utilize 10 to 15 men operating 5 to 7 trucks. Under normal conditions, 3 to 5 miles of line can be surveyed each day using the explosive method. The vehicles used for a drilling program include several heavy truck-mounted drill rigs, water trucks, a computer recording truck, and several light pickups for the surveyors, shot hole crew, geophone crew, permit man, and party chief. Public roads and existing private roads and trails are used. Off-road, cross-country travel is also necessary. Activities in remote areas or difficult terrain may be supported by helicopters. Several trips a day are made along a seismograph line; this usually establishes a well defined two-track trail. Drilling water, when needed, is usually obtained locally.

Surface Charges - Another portable technique eliminates the drill holes by placing the charges on wooden sticks, or lath, 3 feet above the ground. Charges used are either 2- or 5 pounds. Usually, 10 charges in a line are detonated at once. In remote areas, a series of short seismic lines may be used to determine the regional dip and strike of subsurface formations. Seismic lines may then be aligned in relationship to the regional structures to facilitate more accurate seismic data and interpretations. The seismic sensors and energy source are located along lines on a 1- to 2-mile grid.

Primacord - Another seismic technique involves the use of explosive cord. The cord is buried in a 2--foot deep furrow, plowed by a specially designed mechanical plow mounted on a tractor. Multiple sets of cord, often in a pattern, are buried at the same time. This method offers efficiency advantages over the shot hole seismic method in that it is faster, less costly, and the quality of the data is often improved. However, surface disturbance may be considerably greater than with the shot hole seismic method.

4. Post-Lease Preliminary Investigations

If the preliminary investigations indicate that an oil or gas trap may exist in an area, the company may secure leases either directly through the Federal leasing system or from existing leaseholders through assignment (lease is purchased and ownership is assigned). Additional preliminary investigations may be carried out after a lease is acquired. Post-leasing investigations may include airborne and surface operations similar to those of the preleasing phase. The lessee may intensify the seismic studies by extending lines and laying out a criss-cross pattern of lines tying to the previous seismic lines. Other preliminary investigations may also be initiated prior to drilling.

B. EXPLORATORY DRILLING (PHASE 2)

1. Permitting Process

Proposed construction and other operations that involve surface disturbance conducted under the terms of a lease must be approved by the Forest Service before such activities are conducted. Proposed drilling, development, and production operations must be approved by the BLM. Operations must be approved and conducted in accordance with (1) lease terms; (2) 43 CFR 3160; (3) 36 CFR 228, Subpart E; (4) Onshore Oil and Gas Order No. 1; (5) other onshore oil and gas orders; (6) applicable Notices to Lessees (NTL's); (7) conditions of approval; and (8) subsequent orders of the authorized officers of the Bureau of Land Management and Forest Service.

Where preliminary investigations are favorable and information warrants further exploration, exploratory drilling is conducted. More precise data on the geologic structure may be obtained by stratigraphic tests utilizing shallow holes. The presence of suspected oil and gas deposits may be confirmed by exploratory (wildcat) drilling of deep holes. Exploratory drilling on National Forest System lands is authorized only by a Federal oil and gas lease but cannot be conducted unless a surface use plan, drilling program, and Application for Permit to Drill (APD) are approved.

An APD includes a drilling plan which consists of (1) a surface use program, and (2) a drilling program. The detailed information required to be submitted under each program is identified in Onshore Oil and Gas Order No. 1 and 36 CFR 228, Subpart E. An onsite inspection of the proposed wellsite, road location, and other areas of proposed surface use is conducted prior to approval. The Inspection Team includes Forest Service representatives, the lessee or his designated operator, the operator's principal drilling and construction contractors, an archeologist, and when necessary, a BLM representative. The purpose of the onsite inspection is to identify problems and potential environmental impacts associated with the proposal and the methods for mitigating those impacts. These may include making adjustments to the proposed wellsite and road locations, identifying the construction methods to be employed, and identifying reclamation standards for the lands after drilling.

The Forest Service is responsible for conducting the environmental analysis, preparing the documentation, and providing mitigation measures to protect surface resource values on National Forest System lands for APD approvals. The BLM is responsible for approval of the drilling program, protection of groundwater resources, and final approval of the APD.

Other proposals to occupy the surface that involve surface disturbance but are not associated with drilling a well must also receive advance approval under the procedures described above.

There are two options available to the oil and gas operator when applying for approval of an APD. These are (1) the Notice of Staking (NOS) option, and (2) the Application for Permit to Drill (APD) option.

NOS Option - Consists of an outline of what the company intends to do including a location map and sketched site plan. The NOS document is reviewed to identify any conflicts with known resource values, and also used for the onsite inspection and to provide the preliminary data to assess what items are needed to complete an acceptable surface use plan and drilling program.

Application for Permit to Drill (APD) Option - The operator or lessee may submit a completed APD, in lieu of the NOS, to the BLM. A field inspection is held by the BLM with the operator and the Forest Service. The drilling plan may be revised or site-specific mitigations are added as conditions of approval to the APD for protection of surface and/or subsurface resource values in the vicinity of the proposed activity.

Special-Use permits issued by the Forest Service are required for all facilities, tank batteries, pipelines, truck depots, powerlines, and access roads that occupy National Forest System lands outside the lease or unit boundary whether constructed by the lessee/operator or a third party.

2. Oil and Gas Exploratory Units

Surface use in an oil or gas prospect may be affected by unitization (consolidation) of the leaseholds. In areas of Federally owned minerals, an exploratory unit is formed before a wildcat exploratory well is drilled. The boundary of the unit is based on geologic data. The leaseholders of the unit can enter into an agreement to explore and/or develop and operate a unit, without regard to separate lease ownerships. Costs and benefits of the exploration are allocated according to agreed-upon terms. Unitization also has the potential to extend the term of a lease for at least two years.

3. Stratigraphic Tests

Stratigraphic test holes are drilled 100- to 500-feet deep to locate geologic indicators. The holes are usually drilled with truck-mounted equipment and disturb a relatively small area. Casing is needed for stratigraphic holes in areas of shallow high-pressure zones. The roads and trails constructed for access to the test sites are temporary and involve minimal construction. Only 1 to 3 days are required to drill each hole. A truck-mounted drilling rig is utilized. The drillsite occupies an area approximately 30 X 30 feet and is sometimes placed in the center of a new or existing trail.

4. Wildcat Wells

Wildcat wells are deeper tests, require larger drilling rigs with support facilities, and may disturb a larger surface area than stratigraphic tests. Construction of access roads, drill pads, mudpits, and, in some cases, worker camps and helipads, are required to conduct exploratory drilling operations.

The wellsite is selected on the basis of prior surface investigations, seismic surveys, data from other wells that have been drilled in the area, topography, accessibility and requirements of lease stipulations and protection of surface resources.

a. Surface Requirements and Construction - Upon approval of the permit to drill, the construction equipment may enter the leasehold. The types of construction equipment used include dozers (track-mounted and rubber-tired), scrapers, and motor-graders. Moving equipment to the construction site requires several semitrucks.

Construction usually begins with the access road to the wellsite. Generally, the shortest feasible route consistent with the topography is selected to reduce the haul distance and construction costs. In some cases, potential environmental impacts or existing transportation plans dictate a longer route. In rough terrain, the type of construction is sidecasting where the material taken from the cut portion of the road is used to construct the fill portion. Roads are usually constructed to an 18-foot-wide running surface (in relatively level terrain). Road surfacing may be required because of adverse soil conditions, steepness of grade, and moisture conditions.

Wellsites are selected and constructed giving consideration to the amount of level surface required for safe assembly and operation of a drilling rig. The amount of area required varies with the drilling depth and the type of rig used and may vary between 2 and 5 acres in size. The substructure of the drilling derrick must be located on solid ground. Settling of uncompacted fill material under the drill rig has caused the substructure and mast to lean and even fall. In addition to the drilling platform, a reserve pit is constructed to accommodate spent drilling fluids and rock chippings resulting from drilling. The pit is usually square or oblong, but may be constructed in another shape to accommodate topography.

Wellsites are constructed using dozers, scrapers, and motorgraders. All soil material suitable for plant growth is first removed from areas to be disturbed and stockpiled in a designated area. Wellsites located on flat terrain usually require little more than removing the topsoil material and vegetation. Wellsites on ridge tops and hillsides are constructed by cutting and filling portions of the location to provide a level area (drill pad) to accommodate the drill rig, ancillary facilities, and drilling operations. The majority of the excess cut material is stockpiled in an area that will allow easy recovery for reclamation. Extra cut material may need to be stockpiled to avoid casting the excess material down hillsides and drainages where it cannot be recovered for rehabilitation.

Depending on the relation of the drillsite to natural drainages, it may be necessary to construct water bars or diversions. The size of the area disturbed for construction and the potential for successful revegetation often depends on the steepness of the slope.

The drilling rig, and its attendant facilities such as pumps, mud tanks, generators, pipe racks, tool house, etc., are located on the drill pad. Other facilities such as storage tanks for water and fuel may be located on or near the drill pad. A typical wellsite location layout is shown in Figure 2.

Helicopter supported construction and drilling operations can be utilized in some instances. When this occurs, the need for constructing access routes is eliminated.

b. Drilling Operations - Usually drilling activities begin within a week or two after the wellsite and access road have been constructed. The drilling rig and associated equipment are moved to the site and erected. Moving a drilling rig requires 30 to 40 truckloads (some over legal weight, height, and width) of equipment over public highways and private roads.

The most commonly used well drilling equipment is the rotary rig which consists of (1) a power system, normally diesel engine powered electric generators; (2) a hoisting system which consists of a derrick ("mast"), crown block and traveling block used to lift and lower the drill; and (3) the rotary system which consists of the drill bit attached to a length of tubular high tensile steel "drill stem pipe" (collectively called the "drill string") which is turned by a rotary table; and (4) the mud circulating system consisting of mud tanks, mud pumps, and reserve pit.

Depending on the height of the substructures, the mast may rise to over 160 feet above the ground surface and is the most visible and noticeable feature of a drill rig. The start of drilling is commonly referred to as "spudding." The actual drilling is accomplished by passing the drill string through the rotary table which turns the drill string and bit which in turn performs the actual drilling. The weight of the drill string provides downward pressure on the drill bit which chips and pulverizes the rock as it rotates in the bottom of the hole. By continually adding more drill stem pipe to the drill string, the hole is steadily deepened.

A short piece of tubing called a conductor pipe is placed into the ground and cemented in place. The conductor pipe keeps the surface soil from sloughing into the well bore. Next, the regular drill bit and drill string are placed inside the conductor and drill the well begins.

Once the hole reaches a depth of several hundred feet, surface-casing is set and cemented in the hole by pumping cement between the casing and the hole wall. Surface-casing acts as a safety device to protect fresh water zones from drilling fluid contamination to prevent the well from "blowing-out" in the event the drill bit hits a high pressure zone, blowout preventers are mounted on top of the surface-casing. If high pressure zones are encountered that cannot be controlled with mud additives, the blowout preventers can be closed to effectively seal the well.

Blowouts are extremely dangerous and may result in uncontrolled fire, escape of toxic gases, loss of lives, extensive environmental damage, and loss of resources and equipment. It is usually very difficult and expensive to bring a well back under control. Blowout prevention equipment is tested and inspected by both the rig personnel and the BLM. The drill rig crew must be trained in safety and blowout prevention.

After the surface-casing is set, a smaller drill bit that fits inside the surface-casing, is installed and drilling resumes. Depending on well conditions, additional strings of casing called intermediate-casing may be installed and cemented into place. Conditions resulting in the need for intermediate-casing include freshwater zones and sloughing formation zones. Casing prevents the flow of fresh water into the well bore and, conversely, prevents drilling fluids from infiltrating porous formations with low internal pressures. Casing also prevents mixing of waters from different formations (interformational mixing) where water within the formations are of differing quality.

All cementing operation plans are reviewed to assure that cement is placed at the appropriate depths and sufficient quantity is utilized to effectively seal all fresh water-bearing formations from contamination by interformational mixing or migration of fluids.

Drilling mud (fluid) is circulated through the drill pipe and bit to the bottom of the hole, then up the bore of the well, through a screen which separates the rock chips, and into holding tanks from which it is pumped back into the well. The mud is maintained at a specific weight and thickness to cool the drill bit, lubricate the drill string, seal porous rock zones, prevent blowout or loss of drilling fluid, and transport the rock chips resulting from the drilling to the surface for disposal. Various additives are used to maintain the drill mud at the desired viscosities and weights. Some additives that may be used are caustic, toxic, or acidic. The spent drilling mud and rock chips are disposed of in the reserve pit.

FIGURE 2

WELLSITE LOCATION LAYOUT

1 Crown
2 Mast
3 Catline Boom
4 Racking Platform
5 Drill Line
6. Traveling Block
7. Hook
8. Swivel
9. Rotary Hose
10. Standpipe
11. Drawworks
12. Drillers Console
13. Pipe Setback
14. Drill Floor
15. Rotary Table
16. Substructure
17. Blow Out Preventer Stack
18. Dog House
19. Choke Manifold
20. Gas Flare
21. Mud Gas Separator
22. Shale Shaker
23. Degasser
24. Desander
25: Mud Cleaner
26. Mud Guns (Bottom Type)
27. Mud Agitators
28. Mud Tanks (3)
29. Mud Sack Storage
30. Mud Mixing Hopper
31. Mud Mixing Pumps
32. Mud Pumps (2)
33. Pulsation Dampeners
34. Shock Hoses
35. Mud Discharge Lines
36. Brake Water Tank
37. Mud Lab
38. Trip Tank
39 Mud Return Line
40 Drilling Water Tank
41. S.C.R. House
42. Cable Tray
43. Cable Elevator
44. Engines & Generators
45. Engines & Air Compressors
46. Parts Storage
47. B.O.P. Closing Unit
48. Work Shop
49. Pump Parts Storage
50. Fuel Tank
51. Junk Bin
52. Personnel Elevator
53. Wire Line Stand
54. Stairway w/Pipe Ramp
55. Catwalks
56. Drill Pipe
57. Pipe Rack
58. Auxiliary Brake

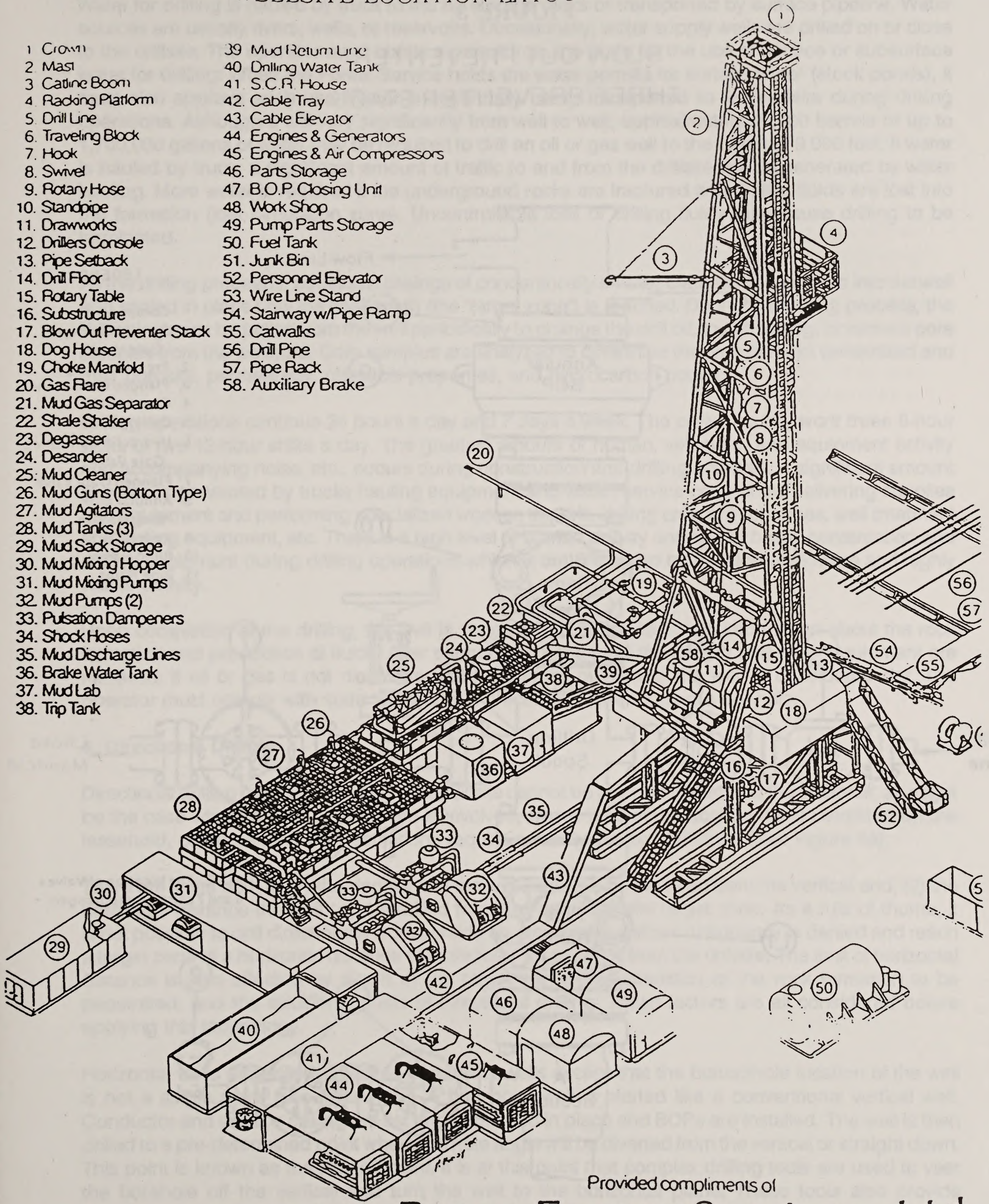


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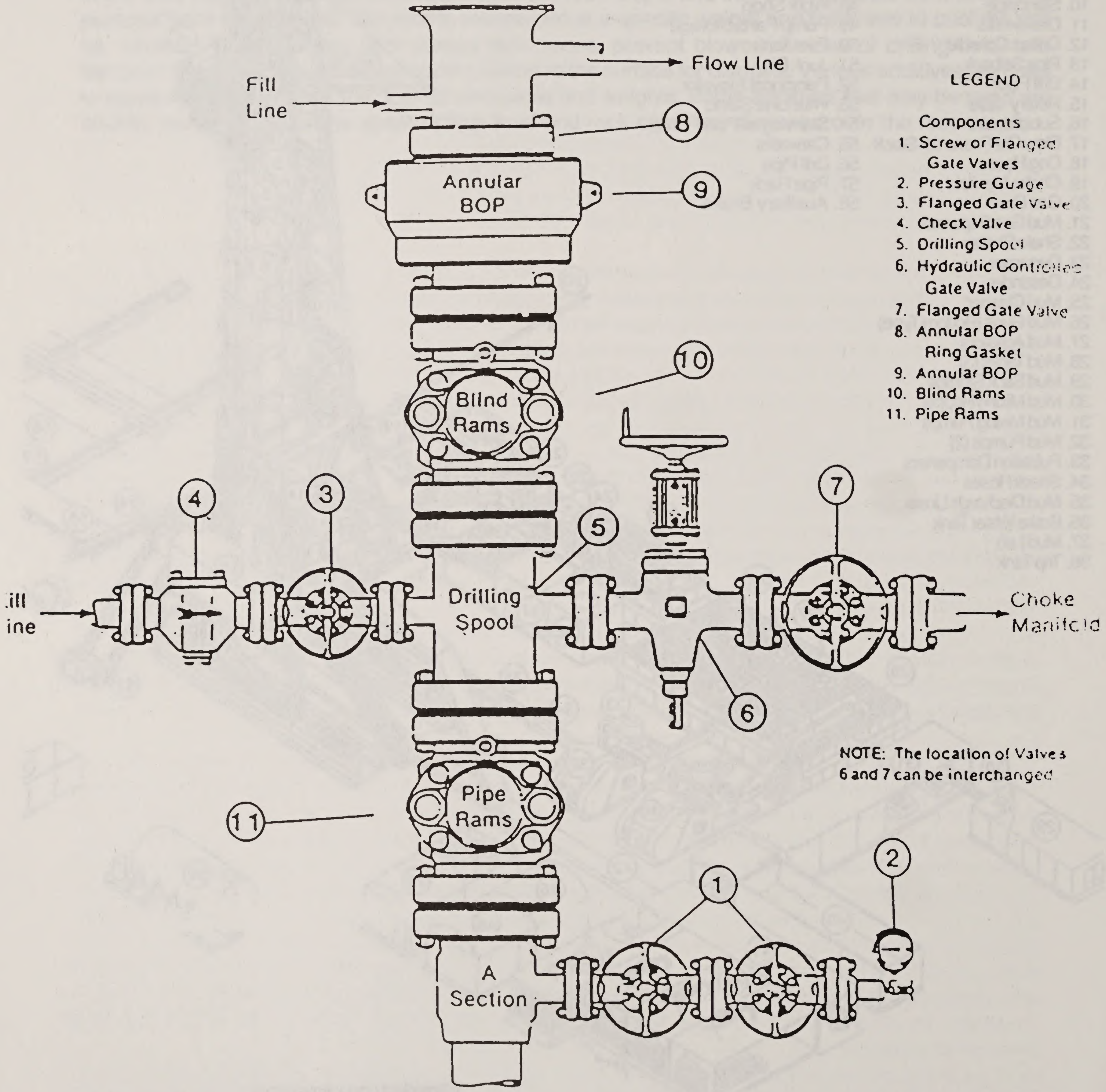
FIGURE 3

BLOW OUT PREVENTER

THREE PREVENTER STACK



LEGEND

Components
1. Screw or Flanged Gate Valves
2. Pressure Guage
3. Flanged Gate Valve
4. Check Valve
5. Drilling Spool
6. Hydraulic Controlled Gate Valve
7. Flanged Gate Valve
8. Annular BOP Ring Gasket
9. Annular BOP
10. Blind Rams
11. Pipe Rams

NOTE: The location of Valves 6 and 7 can be interchanged

SOURCE: BLM, 1988

Water for drilling is hauled by truck to the rig storage tanks or transported by surface pipeline. Water sources are usually rivers, wells, or reservoirs. Occasionally, water supply wells are drilled on or close to the drillsite. The operator must obtain a permit from the State for the use of surface or subsurface water for drilling. When the Forest Service holds the water permits for surface water (stock ponds), it must also approve such use. Water is continually being transported to the wellsite during drilling operations. Although it will vary significantly from well to well, approximately 40,000 barrels or up to 1,700,000 gallons of water may be required to drill an oil or gas well to the depth of 9,000 feet. If water is hauled by truck, a significant amount of traffic to and from the drillsite will be generated by water hauling. More water is required if the underground rocks are fractured and drilling fluids are lost into the formation (lost circulation zone). Uncontrollable loss of drilling fluids may cause drilling to be terminated.

As the drilling proceeds, additional casings of concentrically smaller diameter are lowered into the well and sealed in place until the final depth (the "target zone") is reached. During the drilling process, the drill string must be pulled from the well periodically to change the drill bit, install casing, or remove core samples from the wellbore. Core samples are analyzed to determine the type of rocks penetrated and their porosity, permeability, chemical properties, and hydrocarbon content.

Drilling operations continue 24 hours a day and 7 days a week. The crews usually work three 8-hour shifts or two 12-hour shifts a day. The greatest amount of human, vehicular, and equipment activity and accompanying noise, etc., occurs during construction and drilling activities. A significant amount of traffic is generated by trucks hauling equipment and water, service companies delivering supplies and equipment and performing specialized work on the drill, drilling crew shift changes, well treatment and testing equipment, etc. There is a high level of human activity and use of heavy construction and drilling equipment during drilling operations which is accompanied by considerable noise and highly visible activity.

Upon completion of the drilling, the well is "logged" and tested to obtain information about the rock formation and production of fluids. After completion of the tests the drill rig and other equipment are removed. If oil or gas is not discovered in commercial quantities, the well is considered dry. The operator must comply with state and Federal procedures for plugging a dry hole.

5. Directional Drilling

Directional drilling may be used where the drillsite cannot be placed directly over the reservoir, as might be the case where a river or mountain is involved, where no surface occupancy is permitted on the leasehold, or where land use restrictions require centrally located drillsites. (See Figure 4a).

There are limits both to (1) the degree that the well bore can be deviated from the vertical and, (2) the horizontal distance the well can be drilled from the wellsite to the target zone. As a rule of thumb, it is not possible to drill directionally from outside an area where surface occupancy is denied and reach a target zone at a horizontal distance of more than 1/2 to 1 mile from the drillsite. The limit of horizontal distance is also affected by depth of the target zone, characteristics of the rock formation to be penetrated, and the additional costs of directional drilling. These factors are all considered before applying this technology.

Horizontal wells are drilled similar to directional wells except that the bottomhole location of the well is not a single point (see Figure 4b). A horizontal well is started like a conventional vertical well. Conductor and surface casing are set and cemented in place and BOPs are installed. The well is then drilled to a pre-determined point where the hole angle will be diverted from the vertical or straight down. This point is known as the kick-off point. It is at this point that complex drilling tools are used to veer the borehole off the vertical and turn the well to the horizontal plane. These tools also provide information to the surface on the direction and inclination of the borehole (azimuth and angle). Once the borehole has been turned to the horizontal, the well continues along the horizontal plane until the total permitted length of the horizontal section is reached. Horizontal wells are classified or typed by the distance (both vertically and horizontally) it takes to turn the borehole from vertical to horizontal.

This distance is known as the radius or curvature of the well and there are three basic types. The first type is the short radius well in which the borehole is turned from vertical to horizontal in less than 100' and horizontal section is less than 500'. The second type is the medium radius in which the well is turned in 500' - 1000' and the horizontal section can reach a distance of greater than 1000' and the horizontal distance can exceed 4000'. Most horizontal wells within the study area are medium radius wells. The third type is the maximum radius in which the well needs more than 1,000 feet to attain the horizontal drilling plane.

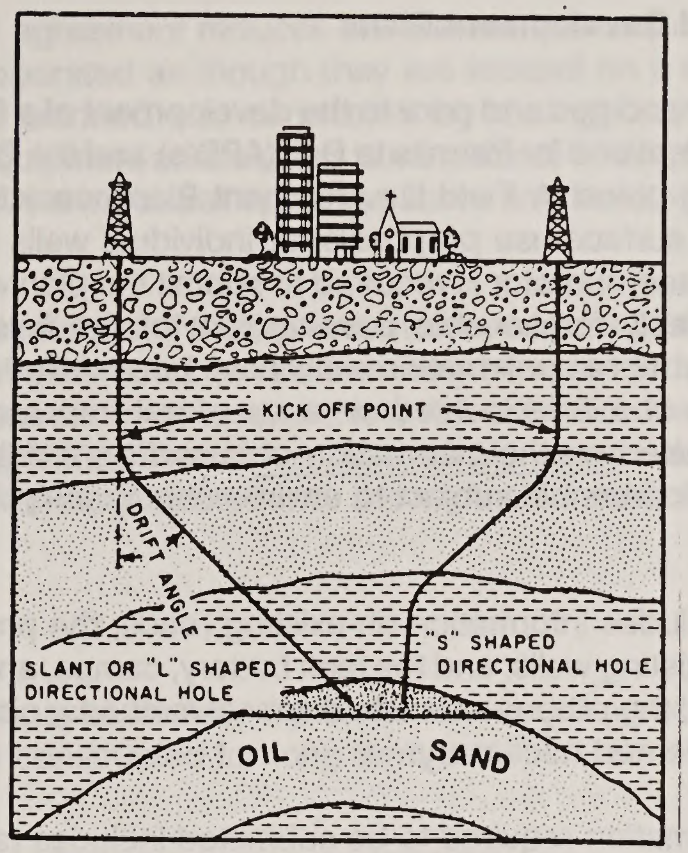
6. Oil and Gas Discovery

At the completion of drilling, the well is evaluated to determine if hydrocarbons can be commercially produced. A "drill stem test" is conducted to directly measure the fluid content (water, oil, or gas) of the formation and the amount of flow and shut-in pressure of the well. The well is "logged" by measuring the electric resistivity which provides information as to the porosity of the rock, the kind of fluids present, and fluid saturation level of the rocks. These physical characteristics of the rock formations and associated fluids are measured and recorded. If it is determined, based on the tests, that the well can be economically developed for production, the well is readied for production, and connected to a gathering system (see Field Development (Phase 3)(p. C-14) and Production (Phase 4)(p. C-19)).

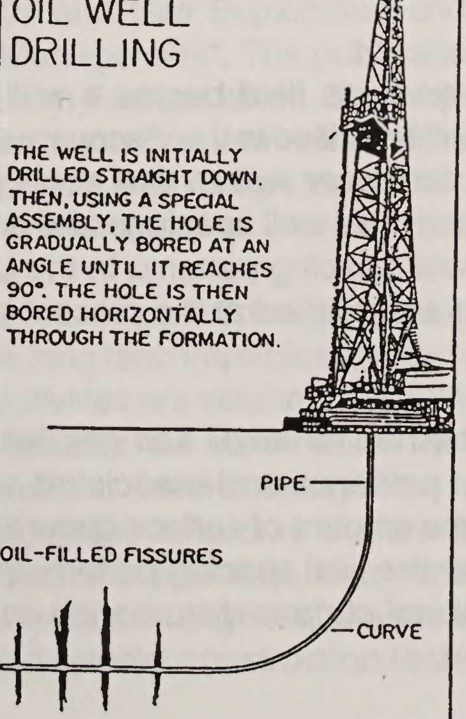
FIGURE 4

a.

DIRECTIONAL DRILLING


KICK OFF POINT
DRIFT ANGLE
"S" SHAPED DIRECTIONAL HOLE
SLANT OR "L" SHAPED DIRECTIONAL HOLE
OIL SAND

b.



THE WELL IS INITIALLY DRILLED STRAIGHT DOWN. THEN, USING A SPECIAL ASSEMBLY, THE HOLE IS GRADUALLY BORED AT AN ANGLE UNTIL IT REACHES 90°. THE HOLE IS THEN BORED HORIZONTALLY THROUGH THE FORMATION.

Source: Courtesy of PETROLEUM INFORMATION

C. FIELD DEVELOPMENT (PHASE 3)

The completion of a wildcat well as a commercial producer marks the beginning of the development of an oil and gas field.

1. Approval of Field Development Plans

After discovery of oil and gas and prior to the development of a field, the lessee/operator must receive approval of the Applications for Permits to Drill (APD's) and the Drilling and Surface Use programs that make up the Drilling plans. A Field Development Plan consists of a coordinated collection of site-specific drilling and surface use proposals for individual wells as required by Onshore Oil and Gas Order No. 1. The lessee/operator is required to submit the plan when sufficient information is available to project a reasonably foreseeable development of the field. Sufficient information may not be available until one or more confirmation wells have been drilled to delineate the characteristics of the reservoir. The limits of a field located on a structural trap can be determined more easily than a stratigraphic field based on the information obtained from drilled wells and geophysical data. The proposed field development is subject to environmental analysis prior to approval or rejection of the APD.

The Drilling Plan includes information on existing roads, the proposed location of the access roads, the proposed and existing wells, and the tank battery, camps, and airstrips; the proposed location and type of water supply; the proposed waste disposal methods; plans for reclamation of the surface; and other information deemed necessary.

The geological information required to be submitted includes (a) occurrence and anticipated depths of fresh water aquifers, (b) expected depths of possible oil or gas productive zones above or below the zone already discovered, (c) other mineral bearing formations, (d) the potential for entering highly permeable formations in which the drilling mud might be lost, (e) the anticipated pressures in the formations to be drilled, and (f) the potential for encountering other geologic conditions which could cause drilling problems. This information is obtained to determine whether the proposed drilling program is adequate, and to insure the drilling mud, pressure control, casing, cementing, testing, well logging, and completion programs adequately protect the surface and subsurface environments, protect other subsurface resources, and provide safe working conditions.

2. Well Spacing Pattern

Before development of an oil and gas field begins a well spacing pattern is established to allot a spacing unit for each well that will be drilled in the discovery area. Oil well spacing patterns in the United States normally range from 2 acres per well to 640 acres per well. Spacing units established for oil production are usually closer than gas well spacings and are generally in multiples of 40 (40, 80, 160, 320, 640 acres per well). Gas well spacing patterns in the United States range from 40 to 1440 acres per well. Most spacing patterns established at the present time for production of gas are 160, 320, or 640 acres per well.

The well spacing pattern established for an oil and gas field is the primary factor that determines the amount and intensity of human presence and associated activity during the development and operation of an oil and gas field and the amount of surface disturbance and land area required to accommodate surface facilities. The wider the well spacing pattern, the lower the intensity and concentration of human activity and the less overall surface disturbance occurs within the oil and gas field.

3. Unitization

Surface use in an oil and gas field is affected by unitization (consolidation of leases) of the leaseholds. In areas involving Federal lands an exploratory unit is formed pursuant to 43 CFR Subpart 3180 through Subpart 3186. The area enclosed within an exploratory unit is based on available geologic data.

A unit agreement provides for (a) development and operation of the field as a single, consolidated unit without regard to separate lease ownerships; and (b) the allocation of costs and benefits according to terms of the agreement. "Exploratory Units" are also formed to share the cost of drilling exploratory wells to test geologic structures. Unit agreements involving Federal leases require BLM approval.

Field development under a unit agreement reduces the surface use requirements because all wells within the unit boundaries are operated as though they are located on a single lease. Development and operations of the field are planned and conducted by a single unit operator and, therefore, duplication of field processing equipment and facilities is minimized. Oil or gas field development under a unitization plan may also involve a wider well spacing pattern and fewer wells than a field developed on a lease by lease basis.

In accordance with unitization provisions, if drilling is commenced prior to the end of the primary term of any lease committed to the unit, then that lease's term may be extended for two years; and so long thereafter as oil or gas is produced in paying quantities. A lease would only receive the benefit of a 2-year extension if there is drilling within the unit over the extension date of the lease(s). If the obligation well was drilled and completed as a dry hole prior to the expiration date of the lease, it would expire under its own terms.

4. Drilling Procedures

The drilling of development wells is essentially the same as the drilling of a wildcat well. Roads and other facilities are planned and constructed for long term use.

5. Surface Use Requirements

Surface uses associated with oil and gas field development wells include access roads, wellsites, flowlines, storage tank batteries, and facilities to separate oil, gas, and water. In remote locations, worker camps may be required. Access roads are planned, located, and constructed for long term use as opposed to roads built for short term use to drill wildcat wells.

6. Surface Use and Construction Standards

The minimum standards for design, construction, and oil and gas operations are set forth in the "Surface Operating Standards for Oil and Gas Exploration and Development, Third Edition - U. S. Forest Service and Bureau of Land Management". The publication prescribes the minimum operating standards for oil and gas operations on Federal lands. The objective of the standards is to minimize surface disturbance, effects on other resources and retain the reclamation potential of the disturbed area. Additional site-specific construction and design standards may be required depending on the proposed activities and conditions encountered at the construction site.

The locations for wellsites, tank batteries, mudpits, pumping stations, roads, and pipelines are selected to minimize to the extent possible the long term impacts to other resources and disruption of other land uses. Ideal locations for oil and gas activities are seldom available and avoidance of damage to surface resources is not always possible. Wellsites are constrained by the geologic target to be drilled and pipelines, because of their linear nature, cannot always be located to avoid all areas exhibiting environmental sensitivity to impacts. In the selection of sites special attention is given to avoiding construction on steep topography and unstable soils, near streams and other open water areas, on cultural resource sites, and in threatened, endangered, or sensitive species habitats. It is not possible or practical to avoid all situations and special construction techniques may need to be employed to minimize the impacts.

Wellsites are usually located on the most level location available that accommodates the intended use consistent with reaching the geologic target. The drillsite layout can also be oriented to conform to or fit into the topographic conditions at the drillsite. However, safety considerations in a hydrogen sulfide (H_2S) area may be an overruling factor when determining the topographic setting and providing adequate escape routes for the drill crew. Onshore Oil and Gas Order No. 6 sets forth hydrogen sulfide gas regulating considerations and requirements. (43 CFR 3160). In general, steeply sloping locations which require deep nearly vertical cuts and steep fill slopes are avoided or appropriately mitigated. The wellsite is also reviewed to determine its effect in conjunction with the location of the access road. Advantages gained on a good wellsite or tank battery location may be negated by adverse effects from the location of the access road.

Wellsite Construction Standards - Construction of the wellsite must conform to the approved wellsite and layout plan in the Surface Use Plan of Operations and excavation of the cut and fill slopes of the wellsite are guided by information on the surveyed construction stakes. Generally all surface soil materials ("topsoil") are removed from the entire construction area and stockpiled. The depth of topsoil to be removed and stockpiled is determined at the predrill inspection and stated either in the proposed surface use plan of operations or specified as a condition of approval. In order to avoid mixing topsoil with subsurface materials during construction and reclamation topsoil stockpiles are located at specified locations, out of the way of construction activities.

Fill materials are to be compacted to minimize the chance of slope failure. Terracing may be used on both cut and fill slopes to reduce the land area occupied by the wellsite, to prevent excessive water accumulation, slope failure, and erosion. If excess material needs to be excavated, the excess material is to be disposed of or stockpiled at approved locations. Snow and frozen soil material cannot be used in the construction of fill areas and a reserve pit.

The area of the well pad that actually supports the drilling rig substructure must be level and capable of supporting the weight of the rig. The drilling rig, tanks, heater-treater, etc., are not placed on uncompacted fill material. The area used for mud tanks, generators, mud storage, and fuel tanks, etc., is usually slightly sloping to provide surface drainage from the work area. Runoff water from off site areas is diverted away from the wellsite by ditches, waterbars, or terraces up-slope from the drilling and wellsite.

The reserve pit is to be located and constructed entirely in cut material. If this is not possible, at least 50 percent of the reserve pit must be constructed below original ground level to prevent failure of the pit dike. Pit dikes constructed of fill material are to be adequately compacted.

Pits improperly constructed on slopes may leak along the plane between the natural ground level and the fill. There is a significant potential for pit failure in these situations.

It may be required to line reserve pits to prevent contamination of ground water and soil. Bentonite, plastic, or other synthetic liners may be required to be used. Fencing of reserve pits is usually required to prevent access to wildlife or livestock. In some environmentally sensitive areas or where topography limits the size of the wellsite, a "self-contained mud system" may be required. The drilling fluids, mud, and cuttings are stored in metal tanks and transported to approved offsite disposal areas.

A closed mud system and safety "surge tank" may be used in lieu of a reserve pit at locations such as areas with limited space in which to locate a drillpad, high water table area, or other situations where a reserve pit cannot be accommodated. The surge tank is used to contain the spent downhole fluids, muds, and cuttings from the wellbore. Since there is no reserve pit in which to dispose of the cuttings and spent drilling fluids they must be periodically trucked from the drillsite during the drilling of the well and disposed of at an approved location. The removal and disposal of the wellbore cuttings and spent drilling fluids is very expensive and closed mud systems, although not infrequently used, are not employed as a standard drilling practice.

Roads and Access Ways - It is Forest Service policy that existing roads be used for access when they are available, when they meet Forest Service standards for the intended use, and when there are no significant conflicts with other uses. When access involves use of existing agency roads, the oil and gas operator may be required to contribute to the road's maintenance. Usually this use is authorized by a joint use agreement in which each user's pro rata share of the road maintenance costs are assessed.

New road construction, or reconstruction, by the operator is consistent with the goals of the Forest's transportation plan and must meet Forest Service standards established for the intended road use.

Proper road location is critical for the engineering success and mitigation of the environmental effects of road construction. The surface and subsurface conditions of a proposed road location also determine the cost to survey, design, construct, and maintain a road. The following factors are considered when determining road locations: (1) the intended use of the road, planned season of use, and type of vehicles to be used; (2) the Forest's transportation plan which may already identify feasible routes for the area; and (3) existing data, including maps and aerial photos, of administrative, biological, physical, and cultural conditions of the area.

A field reconnaissance during the predrill inspection of the proposed and alternative routes is made to determine type of excavation, landslide areas, and subgrade conditions, indicating the need for surfacing, potential cut slope problems, surface or subsurface water problem areas, suitability of fill material, potential gravel pits or quarries for road aggregate, and potential borrow and waste sites.

When steep slope areas, erosion hazard areas, visual resource areas, stream crossings, and other areas of high environmental sensitivity cannot be avoided, special road design, and construction techniques may be required.

Both the BLM and the Forest Service require that all permanent roads constructed by nongovernment entities across public or National Forest System lands be designed by, or constructed under the direction of, a licensed professional engineer. The design and construction requirements depend on the site conditions, planned use of the road, seasons of use, amount and type of traffic, and whether use will be short- or long-term. These factors are also used to determine the class of road built to accommodate the intended use(s).

The specific design specifications and requirements depend on whether the road class is (1) short term, (2) local, (3) collector; or (4) arterial road. Each road class is based on a transportation need and must meet certain design criteria. Other factors, unique and directly applicable to the oil and gas industry, considered include:

- The prevailing wind direction in relation to the potential for encountering sour gas (H_2S) and the need for a clear escape route from the drillsite.

- The potential for year round operation: drillsites and producing locations may require all-weather access and special maintenance considerations for snow removal.

- The potential for exploratory drilling to result in a producing operation. The initial road alignments will be such as to allow upgrading to a permanent road if a discovery is made.

When the road location information is submitted to the Forest Service in the surface use plan, the proposed route, and if applicable, alternative routes, road design standards and construction methods, are evaluated. Final approval of the road location, road design standards, and construction standards are made during processing of the surface use plan.

Pipelines Standards - General pipeline construction standards were established to minimize surface disturbance, provide soil stability, and preserve reclamation potential. Pipeline construction usually involves clearing vegetation and leveling a strip of land wide enough to accommodate a pipeline trench, excavated material, and pipeline construction equipment and transport trucks. The width of the area cleared and leveled is kept to a minimum consistent with access and construction requirements. The width of the disturbed area varies depending on the number of lines within a corridor, size of the pipeline, equipment, and topographic setting.

Locating pipeline routes on steep hillsides and adjacent to live watercourses is avoided to the extent possible. However, because of the extended linear nature of a pipeline these situations cannot be entirely avoided. Extensive cuts and fills that destabilize steep slopes are major problems with sidehill locations. Pipelines located adjacent to watercourses increase the risk of petroleum spills and silt from construction sites entering streams.

Pipeline beds are constructed so they do not block, dam, or change the natural watercourse of any drainage. Pipelines suspended above watercourses must provide adequate clearance for water runoff and waterborne debris, and allow for the passage of wildlife and livestock. Pipelines located on gentle topography usually require less construction and surface disturbance, and are, therefore, inherently more stable and retain greater reclamation potential.

It is a standard practice to stockpile topsoil to the side of the pipeline right-of-way prior to construction and leveling the pipeline bed. The topsoil is segregated and not mixed or covered by excavated material during construction.

Upon completion of construction, the pipeline is graded to conform to the adjoining terrain, the surface soil material returned to the right-of-way, and the pipeline right-of-way waterbarred and revegetated to avoid erosion and minimize the visual intrusion.

7. Oil Field Production Development

Production operations in an oil field begins soon after the discovery well is completed. Portable and temporary facilities located on the drillpad are used to initiate the production of oil from the reservoir. As further drilling proceeds and reservoir limits are established, permanent production facilities are designed and installed at centralized locations. The type, size, and number of the facilities are determined by the number of producing wells, expected production rates, volumes of gas and water expected to be produced with the oil, the number of separate leases involved, and whether or not the field is being developed on a unitized or individual lease basis. Development of production on a lease basis requires handling and processing facilities be installed on or near each lease. Unitization reduces the number of facilities needed to produce, process, and store the oil prior to marketing.

8. Gas Field Production Development

Production operations in a gas field begins when a pipeline to a market outlet is constructed. Market pipelines are not economical unless sufficient gas reserves have been proven to exist by drilling operations. Gas wells are often shut-in after completion for periods of several months or years until a pipeline connection becomes available.

9. Rate of Development

The rate at which development wells are drilled in a newly discovered field depends upon (a) whether the field is developed on a lease basis or unitized basis, (b) the probability of profitable production, (c) the availability of drilling equipment, (d) protective drilling requirements, and (e) the degree to which limits of the field are known. The development of a field that is based on a stratigraphic reservoir may proceed more slowly and yield more dry holes than development of a field located on a structural trap reservoir.

The most important factor when determining how fast field development is undertaken is indicated production potential. If large productive capacity and substantial reserves are indicated, development drilling proceeds at a rapid pace. If there is a question as to whether indicated reserves are sufficient to warrant additional wells, the development drilling occurs at a slower pace. An evaluation period to observe production performance may follow between the drilling of each well.

Development on an individual lease basis proceeds more rapidly than development in a unitized area. When development drilling is undertaken on a lease basis, each lessee drills his own well(s) to obtain production from the field. This creates a competitive situation where the first wells drilled produce the greatest share of oil from the reservoir and quickest and greatest return on investment. When unitized, all owners within the "participating area" share in a well's production regardless of whose lease the well is located on. The development of a reservoir can then proceed in an orderly manner and pace.

10. Protective Drilling

The drilling of a well to prevent drainage of petroleum to a producing well on an adjoining lease may be required in fields which contain a mixture of Federal lands and patented or fee lands. The terms of Federal leases require the drilling of a protective well on the leased tract if an "offset" well is located on adjacent non-Federal lands or on Federal lands leased at a lower royalty rate. An "offset" well is a well drilled at the next location in accordance with the established spacing rule to prevent the drainage of oil and gas to an adjoining tract where a well is being drilled or is already producing.

11. Pool Discoveries

Discovery of a "new pay zone" within an existing field is a "pool" discovery, as distinguished from a new field discovery. A pool discovery results in the drilling of additional wells -- often on the same well pads as existing wells, or often sharing the same boreholes or separated only by a few feet. Existing wells may also be drilled deeper to the new pay zone. Each new pay zone developed requires additional flowlines, storage, and treatment facilities if the fluids from the various pools are to be kept separate. Some fields contain as many as seven, or more, pay zones all sharing a geologic structure that created the conditions for the accumulation of oil and gas.

D. PRODUCTION (PHASE 4)

Production is a combination of operations that includes: (1) bringing the fluids (oil, gas, and water) to the surface; (2) maintaining and/or enhancing the productive capacity of the wells; (3) treating and separating the fluids; (4) purifying, testing, measuring, and otherwise preparing the fluids for market; (5) disposing of produced water; and (6) transporting oil and gas to market.

The production of oil and gas from a single well is usually initiated as soon as drilling is completed and the well is developed for production. In the meantime, other wells may be in production, being drilled, or exist only in the field development plans. There is also usually little time separation between the activities associated with exploratory drilling, oil and gas field development, and actual production of oil or gas. It may take a few months to several years before a field is fully developed. Therefore, field development activities and those activities normally associated with oil and gas production occur simultaneously during the early life of a field. Drilling of new wells is undertaken periodically throughout the life of a producing field to increase or maintain production from the reservoir.

1. Well Completion Report

A "Well Completion or Recompletion Report and Log" must be filed with the BLM within 30 days after completion of a well for production. The completion report reflects the mechanical and physical condition of the well. Geologic information and, when applicable, information on the completed interval and production is required. Operators must notify the BLM no later than the 5th business day after a well begins production.

Horizontal wells are normally completed with steel casing that is installed from the surface through the entire length of the horizontal section. The section of casing in the horizontal portion of the hole already has holes or perforations. Several special tools are installed between the perforated casing and the solid casing to isolate the producing formation from other important and valuable zones above, i.e., other potential producing zones, disposal zones and fresh water aquifers. One of these tools is an inflatable casing packer. This tool does not allow downward movement of fluid in the borehole annulus during cementing operations. Above the packer is a cementing tool which allows fluid (cement) to be diverted from inside the casing to the outside of the casing. With the packer in place and the cementing tool, cement can be circulated or placed in the angle section of the hole and up into the vertical section of the hole. By using a combination of cement tools and other techniques, cementing of casing in horizontal wells provides similar protection as in vertical wells. In some cases, the casing does not have pre-drilled holes for the horizontal section and is completed in a fashion similar to vertical wells, except that the cementing is accomplished in stages to ensure adequate zone isolation.

2. Well Completions

After a well has been drilled and evaluated for its economic worth and profit, work to set the casing and prepare the well for completion and production begins. The decision to complete an individual well for production is based on the type of oil or gas accumulations involved, the expected future development that may be undertaken during the life of the well, and the economic circumstances at the time that the work is done. Completion equipment and the methods employed varies.

Well completion involves installation of steel casing between the surface casing and the oil and gas producing zone. The casing is cemented between the wellbore and casing wall to provide stability and to protect specific zones, i.e., fresh water aquifers. The casing is perforated opposite the "pay zone" and the "pay zone" may then be "stimulated" or "treated" to increase productivity.

The drilling rig and most of the support equipment are moved from the wellsite after the casing is cemented and the pay zone is stimulated. Small diameter "production" tubing is then placed inside the casing down to the producing zone. The tubing is connected to the surface equipment and transports the oil and gas from the bottom of the well to the surface. If the pressure is sufficient to raise a column of oil to the surface the well is completed as a flowing well. When pressure is not sufficient, a pumping system is installed. After the well is completed, the well is tested for a period of days or months before another well is drilled.

Temporary storage tanks are normally used to hold the produced oil during testing. A "separator" is required to separate the gas from the oil. The gas separated from the oil may be burned off as waste until a pipeline connection is available. If water is produced with the oil, a "treater" is needed to separate emulsified oil and water.

3. Well Stimulation

"Well stimulation" is employed to enlarge channels or to create new ones in the producing formation rock to enhance oil and gas production. Since oil is usually contained in the pores or cracks of sand or limestone formations, enlarging or creating new channels allows the oil or gas to accumulate and move more freely to a wellbore. A well may be restimulated several times during its lifetime to maintain or increase production. There is a short term increase in activity at the wellsite during this process. Generally no new surface disturbance is required to perform these operations. Three basic well stimulation methods have been developed: explosive fracturing, acid treatment, and hydraulic fracturing.

Explosive fracturing is used to enlarge the wellbore, eliminate nearby plugging of the rock pores, and force fluids into the formation, thereby fracturing the rock in the proximity of the well bore to stimulate increased production.

Acid treatment dissolves rock with weak hydrochloric acid, thereby enlarging existing channels and opening new ones for oil to flow to the wellbore. Reservoir rocks most commonly acidized are limestone (calcium carbonate) and dolomite that exhibit low permeability. Well servicing rigs are used to prepare both new and old wells for acid treatment.

Hydraulic fracturing is used to create or enlarge cracks in sandstone reservoirs in the same manner as acid treatment is used in limestone or dolomite reservoirs. Hydraulic pressure is applied against the formation by pumping fluid, usually diesel fuel, under high pressure into the well. This pressure splits and cracks the rocks to improve the productivity of the well, or increase the rate fluids can be injected into disposal wells. Most well pads are of sufficient size to accommodate the trucks and other equipment needed to complete a "frac" job, however, a second pad and additional surface disturbance may be required for safety considerations and to accommodate the large amount of equipment needed to perform special "massive fracture" jobs.

4. Oil Wells - Wellhead Facilities

The "wellhead" is the equipment installed to maintain control of the well at the surface and to prevent well fluids from "blowing" or "leaking" at the surface. The pressures encountered in the well determine the type of wellhead equipment needed. This varies from a simple assembly to support the weight of the production tubing in the well to a high-pressure wellhead to control reservoir pressures. Pressures in these reservoirs are usually great enough to result in a "flowing" well. However, after reservoir pressures are depleted, some type of artificial lift is usually required to bring the oil to the surface.

a. Flowing Wells - The surface equipment at the head of a flowing well is limited to a series of valves, or "Christmas tree," and a fenced service area ranging from 15 by 15 feet to 50 by 50 feet around the wellhead. (See Figure 5). A service area may also contain a small (1 by 2 by 3 feet) gas powered chemical pump and "guy line" anchors for servicing units brought in for well repairs. Chemical pumps used to inject emulsion breakers, corrosion inhibitors, or paraffin solvents into the well or flowline may be present.

b. Artificial Lifts (Pumping) - When a well is completed, the natural reservoir pressure drives the fluid to the surface. At some time during the life of an oil well, the pressure is depleted and some form of artificial lift is used to raise the fluid to the surface. The most common methods of artificial lift are sucker rod pumps, centrifugal pumps, hydraulic pumps, and gas lift. All of the pump systems require some type of surface equipment and a power system. All power systems generate noise, however, this ranges from almost none for electric motors to high noise levels for single cylinder gas engines.

Sucker Rod Pumps - The pumping unit is the most visible and recognizable piece of equipment within oil fields. Pumping units vary in size from 4' to over 25' in height depending on depth of well. (See Figure 6). The principle of the sucker rod pump is the same as that of the common hand pump used to lift water. A series of rods and a valve move up and down through a "stuffing box" in the well to bring the oil to the surface. The stuffing box is regularly maintained to prevent oil leaks from the wellhead. Failed packing in stuffing boxes is a common cause of oil spills. The rod is connected to a reciprocating pumping unit or pump jack. Surface pumping units are usually powered by electric motors, however, internal combustion engines are used when electric power is not available. Single-cylinder engines operate at very high noise levels, whereas multi-cylinder engines operate at lower noise levels and electric motors at a very low noise level.

Centrifugal Pumps - Centrifugal submersible oil well pumps consist of a stack of 25 to 300 electric powered small pumps located inside the well casing. Centrifugal pumps require little equipment above the ground and generate no noise at the surface. Surface equipment requirements include a switch or control cabinet, the wellhead, a spool for the cable used to transmit electricity to the pumps, and an electric powerline.

Hydraulic Pumps - The pumping unit of a hydraulic system is located inside the well and is powered by oil under high pressure. The equipment required on the surface includes a storage tank for the power oil, a pump to pressurize the oil, an electric motor or internal combustion engine to power the oil pump, power oil regulating valves and pressure gauges, hydraulic pump and the oil wells. The total surface area used for this type of facility may be greater than for other pumping systems if a centralized power system and additional oil pressure lines are used to carry the power oil from the pump to the wellheads. The noise level created at the wellhead depends on whether an electric motor or internal combustion engine is used to power the oil pump.

Gas Lift - Gas lift is commonly used where low-cost, high pressure natural gas is available and where pressure in the petroleum reservoir is sufficient to force the petroleum part of the way up the well. In this system natural gas under pressure is injected into well casing. The gas forces the fluids up the production tubing to the surface. The gas pressure maintained inside the casing creates a flowing well. The surface equipment used for gas lift includes gas compressor, oil storage tank, and separator. The system is quiet if the compressor is powered by electric motor and little physical space is required at the wellhead.

5. Gas Wells

Most gas wells produce by normal flow and, in most cases, do not require pumping. Surface use at a flowing gas well usually is limited to a 20-foot by 20-foot fenced area. Water may enter a gas well and choke off the gas flow. A pump is then installed to pump off the column of water. Some gas wells may require periodic to almost continual water pumping. The typical gas wellhead facilities are similar to those of a flowing oil well, consisting of a relatively unobtrusive wellhead "Christmas tree".

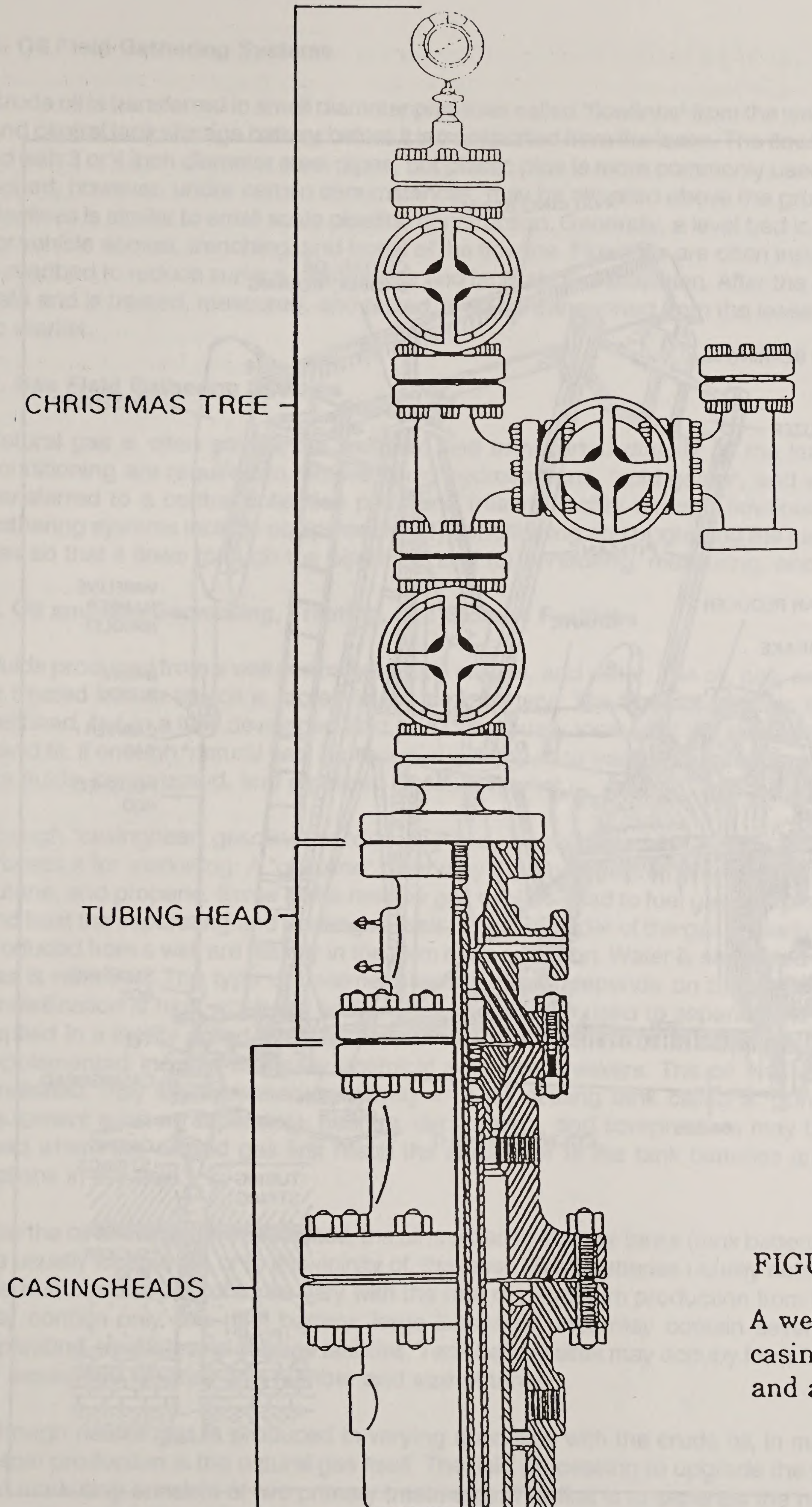


FIGURE 5

A wellhead has one or more casingheads, a tubing head, and a Christmas tree.

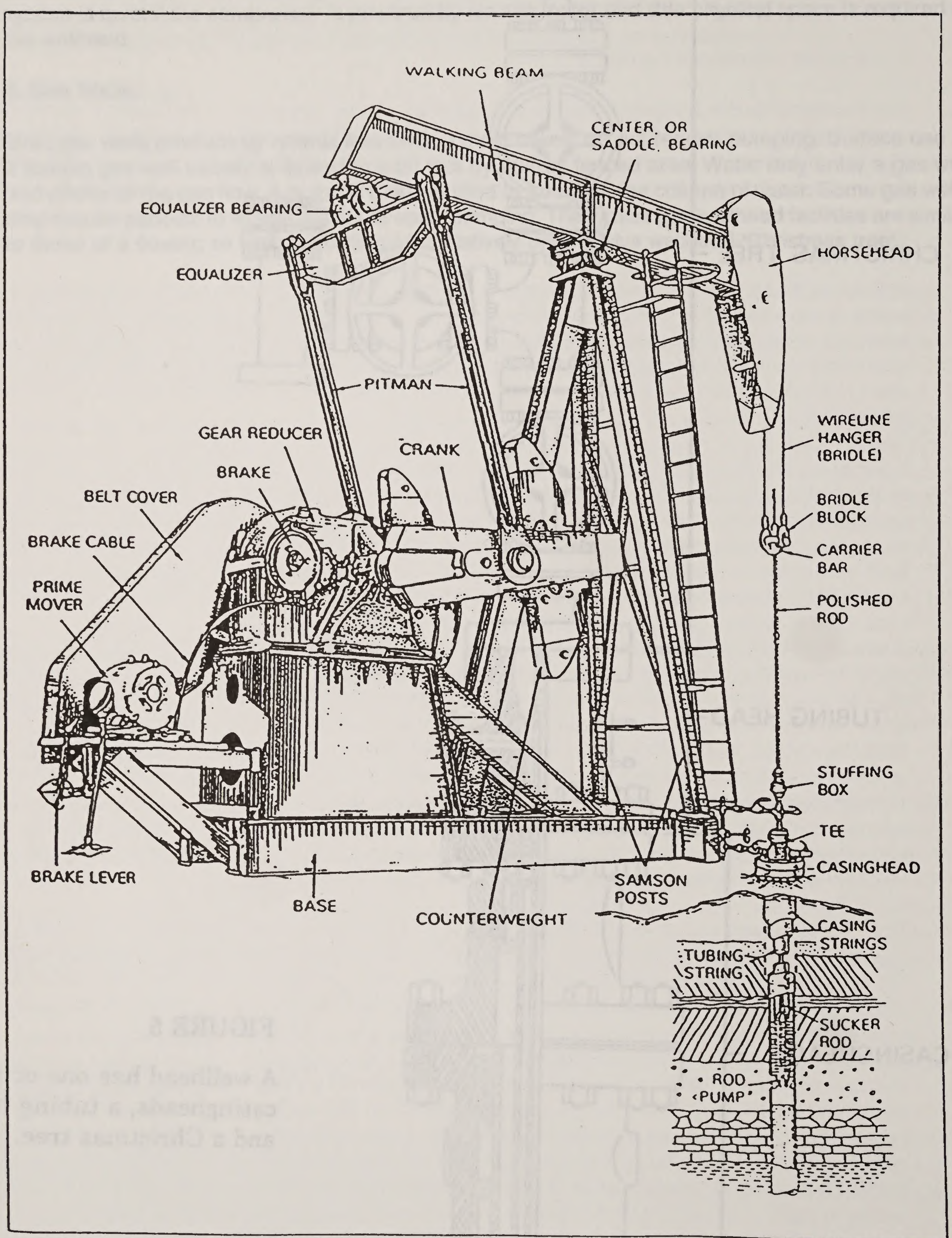


FIGURE 6

SUCKER ROD PUMP UNIT

6. Oil Field Gathering Systems

Crude oil is transferred in small diameter pipelines called "flowlines" from the wells to treatment facilities and central tank storage battery before it is transported from the lease. The flowlines may be constructed with 3 or 4 inch diameter steel pipes, but plastic pipe is more commonly used. Flowlines are usually buried, however, under certain circumstances, may be elevated above the ground. The installation of flowlines is similar to small scale pipeline construction. Generally, a level bed is constructed to provide for vehicle access, trenching, and burial of the flowline. Flowlines are often installed in, or adjacent to, a roadbed to reduce surface disturbance and facilitate its installation. After the oil is gathered from the field and is treated, measured, and tested, it will be transported from the lease by pipeline or trucked to market.

7. Gas Field Gathering Systems

Natural gas is often sold at the wellhead and transported directly off the lease. If processing and conditioning are required to remove liquid hydrocarbons, "acid gases", and water, the gas may be transferred to a central collection point and treating facility through flowlines prior to sale. All gas gathering systems include equipment for (1) conditioning and upgrading the gas; (2) compressing the gas so that it flows through the pipelines; and (3) controlling, measuring, and recording its flow.

8. Oil and Gas Separating, Treating, and Storage Facilities

Fluids produced from a well normally contain oil, gas, and water. The oil, gas, and water are separated or treated before the oil is stored in the tank battery. The treating facilities may be located at the wellhead, but in a fully developed field, they are usually located at the tank battery site. (See Figures 7 and 8). If enough "natural gas" is produced with the oil to warrant separation, it will be separated from the fluids, compressed, and pipelined direct to market.

Enough "casinghead gasoline" or "drip gas" may be produced in the field to make it economical to process it for marketing. A "gasoline" plant may then be built in the area to remove natural gasoline, butane, and propane. Some of the residue gas may be used to fuel gas compressors, pump engines, and heat the separating and treating vessels. The remainder of the gas is marketed. The oil and water produced from a well are usually in the form of an emulsion. Water is separated and removed after the gas is removed. The type of treatment facilities used depends on the amount of emulsification. If emulsification is high, chemical and/or heat treatment is used to separate the oil and water. Heat is applied in a facility called a "heater-treater" which breaks the oil in water emulsification. The heat is supplemented in most cases by chemical emulsion breakers. The oil and water, when not highly emulsified, may be separated by gravity in a tall settling tank called a "gun barrel". Conditioning equipment such as separators, heaters, dehydrators, and compressors may be located at the wellhead where the oil and gas first reach the surface or at the tank batteries and/or gas compressor stations in the field.

After the oil and water are separated, the oil is piped to storage tanks (tank batteries). The tank batteries are usually located on, or in the vicinity of, the lease. Tank batteries usually contain at least two tanks. The number and size of tanks vary with the rate of petroleum production from the field. Small leases may contain only one tank battery; large leases or units may contain several, each with its own separating, treating, and storage facilities. Tank battery sites may occupy from 1 to 5 acres depending on associated facilities and number and size of tanks.

Although natural gas is produced in varying quantities with the crude oil, in many fields the primary or sole production is the natural gas itself. The field processing to upgrade the gas for transportation and marketing consists of two primary treatments. The first is to separate the natural gas from crude oil and/or other liquid condensates including free water. In this process the gas is run through "separators" and "heater" to separate the liquids from the gas. The gas is then run through a "dehydration unit" to remove the remaining water vapor. The removal of the water vapor is important since in the presence of natural gas or other hydrocarbons it will form "hydrates" which precipitate out and cause blockage of pipelines. The treatment of the gas is done either at the wellhead or at a centralized field facility located at the tank battery site or at a compressor plant. No gas is stored at these facilities but is entered directly into a marketing pipeline after treatment.

Hydrogen sulfide (H_2S) and carbon dioxide (CO_2) are "acid gases" commonly produced with the natural gas. H_2S is extremely toxic, heavier than air, is highly corrosive to unprotected metal, and will cause eventual failure of the metal. Unless these gases are present in very small quantities they must be removed from the natural gas. There are several processes used to remove "acid gases". The most common is the alkanolamine process in which the gas is absorbed in an alkanolamine solution. Large compressors are used to compress the gas up to, or in excess of, a hundred times the normal atmospheric pressure. Large reciprocating compressors driven by gas engines are used, but centrifugal units driven by gas turbines or electric motors are also used. Large compressor stations along the pipeline often use natural gas from the pipeline for fuel. Compressor stations operate at a high noise level and are normally housed in large metal buildings. Storage and maintenance facilities for the gas field's operations are usually located at the compressor station. Compressor stations are the largest and most visible features in a gas field and are the center of most of the human activity.

9. Disposal of Produced Water

After water is separated from oil at the tank battery, it is disposed of under BLM approval and supervision. Although most produced waters are brackish to highly saline, some produced waters are fresh enough for beneficial surface use.

Produced water from oil and gas operations is disposed of by subsurface injection, lined pits, or other methods acceptable to the BLM, in accordance with the requirements of Notice To Lessees 2B titled: "Disposal of Produced Water", or an applicable Onshore Oil and Gas Order. Disposal of produced water by disposal/injection wells requires permit(s) from the primacy State or Environmental Protection Agency (EPA). Approval of surface use by the Forest Service is also required. The state of Montana has primacy for the surface disposal of produced water and the EPA has authority for underground injection disposal. The state of Montana does permit surface pit disposal (evaporation) of produced water.

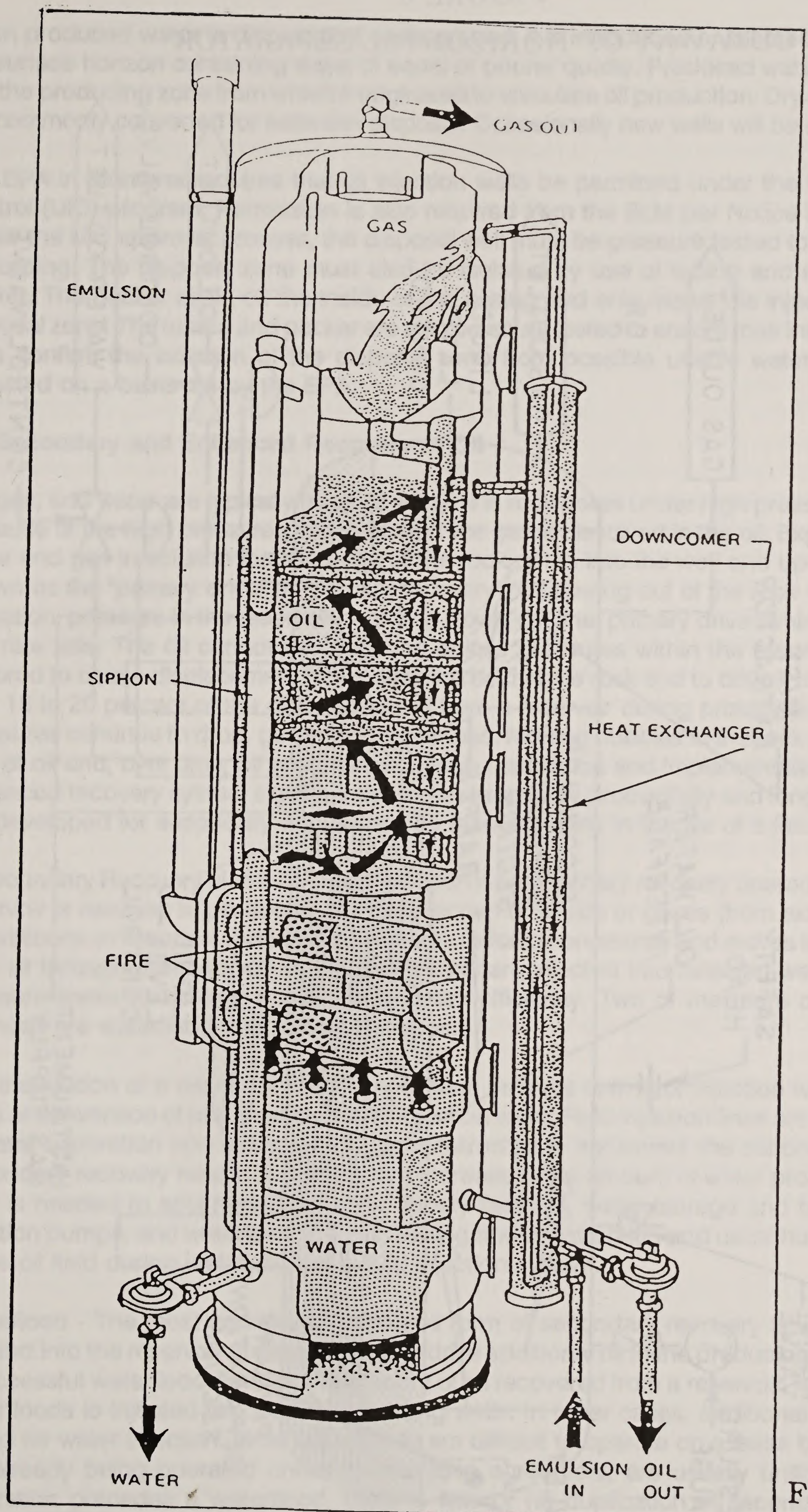
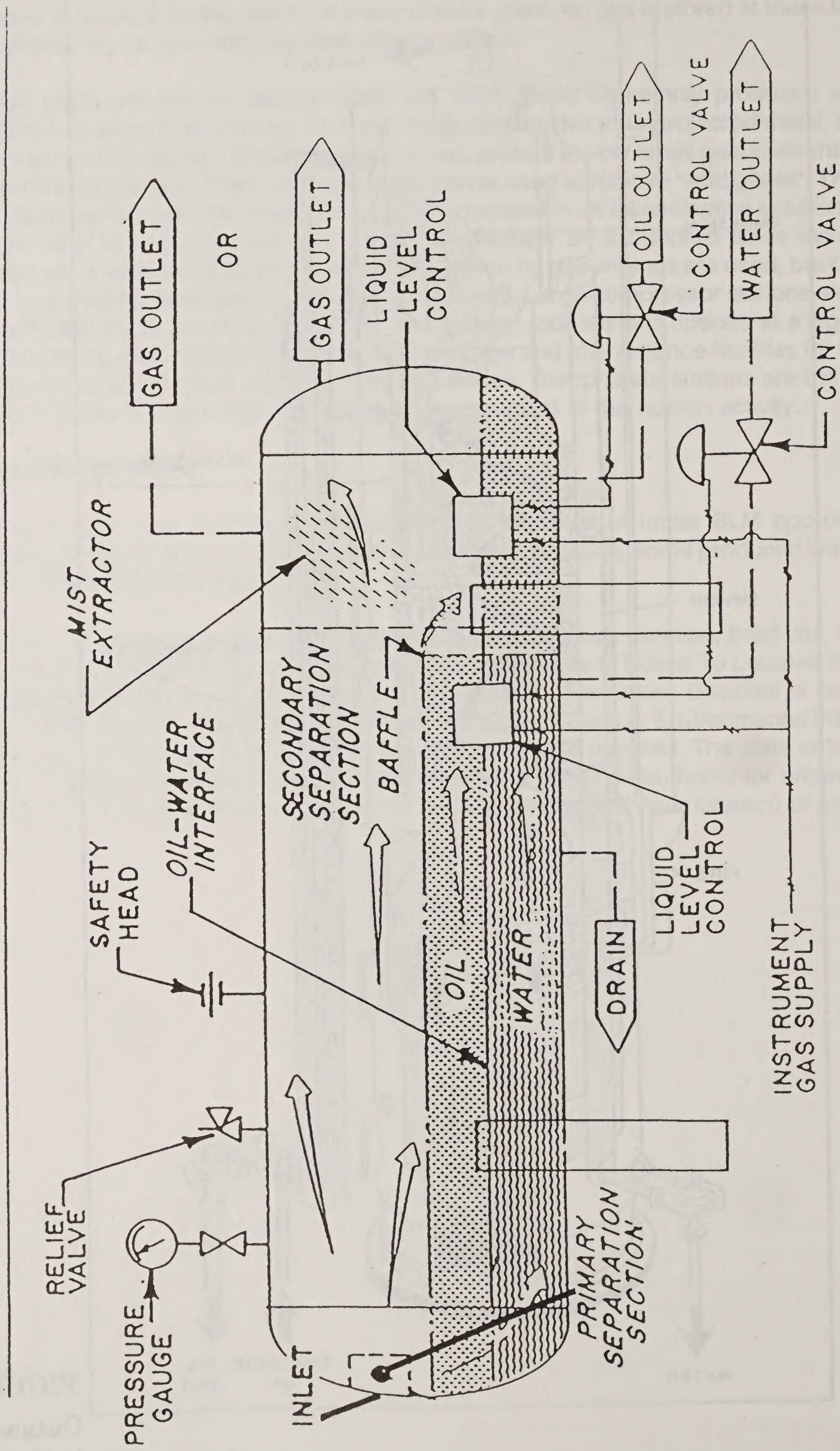


FIGURE 7
Cutaway view of vertical heater-treater

FIGURE 8

CUTAWAY OF HORIZONTAL SEPARATOR



When produced water is disposed of underground, it is introduced or injected under pressure into a subsurface horizon containing water of equal or poorer quality. Produced water may also be injected into the producing zone from which it originated to stimulate oil production. Dry holes or depleted wells are commonly converted for saltwater disposal. Occasionally new wells will be drilled for this purpose.

The EPA in Montana requires that all injection wells be permitted under the Underground Injection Control (UIC) program. Permission is also required from the BLM per Notice to Leasees (NTL - 2B). Under the UIC approval process, the disposal well must be pressure tested to ensure the integrity of the casing. The disposal zone must also be isolated by use of tubing and mechanical plug call a packer. The packer seals off the inside of the casing and only allows the injected water to enter the disposal zone. The tubing and packer are also pressure tested to ensure their integrity. These pressure tests confirm the isolation of the disposal zone from possible usable water zones. The tests are repeated on a basis set by the EPA.

10. Secondary and Enhanced Recovery of Oil

Oil, gas, and water are typically trapped within fine rock pores under high pressure in the oil reservoir. Because of the high pressures, much or all of the gas is dissolved in the oil. Expansion of pressurized water and gas in solution forces oil out of the rock pores into the well and up to the surface. This is known as the "primary drive" or "primary recovery". Oil flowing out of the rock drains energy from the formation; pressure in the reservoir begins to slowly decline; primary drive diminishes and the production rate falls. The oil cannot be produced unless pressures within the reservoir are maintained or restored to cause displacement of the oil being held in the rock and to drive it to the wellbore. Usually, only 15 to 20 percent of the oil is recovered from a reservoir during primary production. As reservoir pressures continue to drop, gas in the oil escapes, forming bubbles in the rock pores. This retards the flow of oil and, over time, oil production ceases. Installation and implementation of a secondary and enhanced recovery system significantly increases a field's productivity and longevity. Many reservoirs are developed for secondary and enhanced recovery early in the life of a field.

a. Secondary Recovery Methods - Fluid injection is a secondary recovery operation in which a depleted reservoir is restored to production by the injection of liquids or gases (from extraneous sources) into the wellbore. In essence, this injection restores reservoir pressures and moves the formerly unrecoverable oil through the reservoir to the well. Fluids are injected into selected wells at, or near, original pressure levels to achieve maximum recovery efficiency. Two of the more common fluid injection methods are waterflood and saltwater disposal.

The installation of a secondary recovery system involves drilling of injection wells and new recovery wells or conversion of production wells to injection wells. Fluid injection lines are installed and additional water separation and storage facilities constructed to implement the secondary recovery system. Secondary recovery results in a significant increase in the amount of water produced. Additional land area is needed to accommodate water supply facilities, water storage and treating facilities, water injection pumps, and waterlines to wells. Drilling and construction and other human activities intensify in the oil field during installation of a fluid injection system.

Waterflood - The most commonly employed form of secondary recovery is waterflooding. Water is injected into the reservoir under pressure to drive additional oil to the producing wells. On the average, a successful waterflood doubles the amount of oil recovered from a reservoir. In some fields, water for waterfloods is injected into depleted existing wells. In other cases, additional wells may need to be drilled for water injection. Most waterfloods are difficult to operate on a lease basis, so entire fields, if not already being operated under a unitization agreement, are usually unitized before flooding. If unitization precedes a waterflood, there is little or no duplication of secondary recovery facilities. However, additional surface area is used for the water supply facilities, water storage and treating facilities, water injection pumps, and waterlines to injection wells. If the injection well is a converted producing well, the waterline replaces the producing flowline. If the injection well is a converted dry hole or a new well drilled for the waterflood, the water injection line is the only addition to the pipeline system and requires the same amount of land as a flowline for a producing well.

Gas Injection - Gas injection is a secondary recovery technique that is generally used only in oil and gas reservoirs which have an existing gas cap. Natural gas is injected under pressure to restore and maintain reservoir pressures to displace and move oil to the producing wells.

Saltwater Disposal - Although not a secondary recovery process, per se, saltwater disposal is a common form of fluid injection. Its primary purpose is simply to dispose of the saltwater produced with crude oil. A typical system is composed of collection centers in which saltwater from several wells is gathered, a central treating plant in which corrosion-forming substances are removed, and a disposal well. The saltwater is injected into the originating zone and used to pressurize and drive the oil towards the borehole of a producing well. (See Disposal of Produced Water.)

b. Enhanced Recovery Methods (Tertiary recovery) - Enhanced recovery methods increase the amount of oil produced and recovered from an oil reservoir beyond that obtained from primary and secondary methods. Enhanced oil recovery techniques employ chemicals, water, gases, and heat singly, and in combination, to reduce the factors that inhibit oil recovery. Considerable technical and financial risk is involved because of the large investment in equipment and the unknown factors or characteristics of the oil reservoir that may affect the success of an enhanced recovery method. There are three broad categories of enhanced recovery methods currently used; namely (1) thermal enhancement, which primarily involves injecting high pressure steam into the oil reservoir to reduce oil viscosity and increase its ability to flow; (2) miscible flood, in which propane, butane, natural gas, CO_2, or other gases are injected into the reservoir to dissolve and displace the oil; and (3) chemical enhancement, which includes injecting polymers to thicken injected waters which increase uniformity of oil displacement in the reservoir or injecting detergents ("surfactants") that essentially "wash" the oil from the reservoir rocks.

As with secondary recovery systems, additional land surface is required to accommodate the injection and oil recovery systems. This includes additional wells, injection lines and flowlines, roads, storage, and treatment facilities, pumps, and injection equipment. There is also an increase in construction and drilling activities during the installation of all enhanced recovery systems.

11. Transportation Pipelines

A transportation pipeline is needed in order to transport natural gas and oil to market or refineries. In most cases, oil is transported to the refinery via a pipeline, although trucks may be used to transport oil from isolated fields or new fields to pipeline terminals or the refinery.

Oil is moved through the pipeline by pumps. Pump stations are located either at gathering stations or trunkline stations or a combination of both. A gathering station is located in or near an oil field and receives oil through a pipeline gathering system from the operators' tanks. From the gathering station, oil is relayed to a trunkline station, which is located on the main pipeline, or trunkline. The trunkline station relays the oil to refineries or shipping terminals. To maintain pressure, booster pumps are spaced along the trunkline. Tank batteries located along the line receive and temporarily store the oil before it continues.

Months and sometimes years of engineering studies and surveys of potential gas reservoirs and markets precede the final decision to build a pipeline.

Construction of a large transportation pipeline may involve as many as 250 to 300 men in a normal operation and up to 500 men in a very large operation. The amount of construction equipment needed depends on the variety and difficulty of terrain. Stream crossings, marshes, bogs, heavily timbered forests, steep slopes, or rocky ground can require different types of equipment and construction practices. 250 to 300 men can move at a rate of 3 miles a day with a distance of sometimes 10 or 15 miles separating the beginning of the work crew from the end.

In practice, a strip of land from 50 to 75 feet wide is cleared depending on the size of the pipe and the type of terrain. The clearing crews open fences and build gates, cattle guards, and bridges. Salable timber cut by clearing crews is stacked; the rest is cut and disposed of. A roadway capable of supporting vehicle access is graded and completed adjacent to the pipeline. The cleared area needs to be wide enough for the pipeline trench, the largest side-boom tractor, and transportation of pipe and equipment. In rocky terrain, a machine equipped with a ripper that extends several feet into the ground is often used to loosen rocks for removal before the ditching operation begins.

A ditch is made by loose-dirt ditching machines or by wagon drills suspended from side-boom tractors. Dynamite blasting is used for very hard rock surfaces. Pipe is transported to the ditching sites where the pipe is coated, double jointed, welded, and lowered into the ditch. The pipe must be buried deep enough to ensure that it does not interfere with normal surface uses. The Department of Transportation requires a minimum of 36 inches of cover. The trench is backfilled, compacted, and the cleared area waterbarred, and revegetated.

12. Well Servicing and Oil and Gas Field Maintenance

Producing wells in active oil and gas fields periodically require repair and workover operations. Operations involving no new surface disturbance to redrill, deepen, and plug-back require prior approval of the authorized officer of the BLM. In some cases, these operations require the approval of the Forest Service.

No prior approval or subsequent report is required for well cleanout work, routine well maintenance, bottom hole pressure survey, or for repair, replacement, or modification of surface production equipment provided no additional surface disturbance is involved.

When prior approval is required, the operator must submit a Sundry Notice, or APD, as applicable. A detailed written statement of the plan of work must be provided to the authorized officer with the appropriate form. When additional surface disturbance will occur, a description of any subsequent new construction, reconstruction, or alteration of existing facilities, including roads, damsites, flowlines and pipelines, tank batteries, or other production facilities on any lease, must be submitted to the authorized officer for environmental reviews and approvals. On National Forest System lands, the BLM coordinates with the Forest Service to obtain their approval on the surface disturbing activities. Emergency repairs may be conducted without prior approval provided the authorized officer is promptly notified.

The servicing of individual wells to improve or maintain oil and gas production is an activity that extends throughout the life of the field. This work is usually performed with the use of a well servicing unit or self propelled workover rig which is similar to a scaled down oil rig. Both the workover rig or well servicing unit carry hoisting machinery that is used to pull sucker rods and tubing from the wellbore. The most common well servicing operations conducted are: cleaning out the well, changing pumps, repairing rod string and tubing, changing the producing and reestablishing oil producing intervals, installing artificial lift, and repairing casing and other downhole equipment. There is an intense, but short term, increase in human and motorized activity at the wellsite during servicing.

Construction, reconstruction, and normal maintenance work continue throughout the field's life. Flowlines, pipelines, pumping units and other oil and gas field equipment which is no longer functional because of corrosion, metal fatigue, wear, or because it has become outdated and inefficient is replaced, upgraded, or abandoned and removed. Major and minor maintenance activities are a normal part of the operations during the life of the oil and gas field.

13. Pollution Control

All spills or leakages of oil, gas, produced water, toxic liquids or waste materials, blowouts, fires, personal injuries, and fatalities must be reported by the operator to the BLM and the surface management agency in accordance with the requirements of Notice to Lessees 3A, (NTL 3A), "Reporting of Undesirable Events", or an applicable Onshore Oil and Gas Order. The BLM requires immediate reporting of all Class I events (more than 100 barrels of fluid/500 MCF of gas released or fatalities involved). A "spill prevention, control, and countermeasure plan" is required by the Environmental Protection Agency under 40 CFR Part 112 and any discharge of oil (oil spill) must be reported immediately to the National Response Center, EPA (See 40 CFR 110).

Firewalls/containment dikes must be constructed and maintained around all storage facilities/ batteries. The containment structure must have sufficient volume to contain, at a minimum, the entire content of the largest tank within the facility/battery, unless more stringent site-specific protective requirements are deemed necessary by the authorized officer.

14. Inspection and Enforcement

The BLM and Forest Service have developed procedures to ensure that leaseholds which are producing or expected to produce significant quantities of oil or gas in any year, or have a history of noncompliance, are inspected at least once a year. Other factors such as health, safety, and environmental concerns, and potential conflict with other resources also determine inspection priority. Inspections of leasehold operations ensure compliance with applicable laws, regulations, lease terms, Onshore Oil and Gas Orders, NTL's, other written orders of the authorized officer, and the approved plans of operation. The administration of oil and gas operations on National Forest System lands is conducted in accordance with 36 CFR 228.111 through 36 CFR 228.114 and Bureau of Land Management oil and gas regulations 43 CFR 3160.

E. ABANDONMENT (PHASE 5)

All abandonments, whether they involve one wildcat well, a well no longer productive, or an entire leasehold, require the approval and acceptance of the abandonment of the individual well(s) by the BLM and the Forest Service. An acceptable abandonment includes (1) the plugging of the wellbore and (2) reclamation of the land surface to a stable and productive use.

1. Approval of Abandonment

Well abandonment operations may not be started without prior approval of a "Sundry Notices and Reports on Wells" by the authorized officer of the BLM. The Sundry Notice serves as the operator's Notice of Intent to Abandon (NIA). In the case of newly drilled dry holes, failures, and in emergency situations, oral approval may be obtained from the authorized officer followed by written confirmation. In such cases, the surface reclamation requirements will have been discussed with the operator and be included in the approved APD. Additional surface reclamation measures may be required by the Forest Service. For older existing wells, not having an approved surface use plan of operations, a reclamation plan must be submitted with the NIA. Reclamation requirements are part of the approval of the NIA. The operator must contact the BLM prior to plugging a well to allow for approval and witnessing of the plugging operations.

a. Plugging of Wells - The purpose of plugging a well is to prevent fluid migration between zones within the wellbore, to protect other minerals from damage, and to prevent escape of well gas or fluids to the surface. Well plugging requirements vary with the characteristics of the rock, geologic strata, well design, and reclamation requirements.

Drilling well or open hole situations: The plugging of drilling wells or open holes must be in accordance with Onshore Oil and Gas Order No. 2. These requirements specify that cement plugs must extend at least 50 feet above and below zones with fluid which has the potential to migrate, zones of lost circulation, and zones of potentially valuable minerals. Thick zones may be isolated using 100 foot plugs across the top and bottom of the zones. In the absence of productive zones and minerals, the long sections of open hole are plugged with 100 foot plugs spaced every 3,000 feet. A 100 foot cement plug is placed across the surface casing shoe (the bottom of the surface casing). This plug must extend at least 50 feet below the shoe and 50 feet above the shoe (inside the surface casing).

All cement plugs must have sufficient volume to fill 100 feet of hole plus an additional volume of 10 percent per 1000 feet of depth (a 100 foot plug at 5000 feet would be required to have an additional 50 feet of cement). The surface shoe plug is tested by tagging with drillpipe. Tagging is accomplished by setting the weight of the drillpipe down on the cement plug to establish that a competent plug exists at the depth specified. Since the surface casing protects aquifers, the surface shoe plug provides the last means of protection if the other downhole plugs should fail. The top of the surface casing is plugged with a minimum of 50 feet of cement.

Depleted producers or cased hole situations: For cased holes, all perforations must be isolated so as not to allow fluid to migrate up hole or to the surface. The perforations may be isolated by: 1) placing a cement plug across the perforations and extends 50 feet above and below the perforations, or 2) setting a cement retainer (cement tool that acts like a plug except that cement can be pumped below the tool but no fluid can pass above the tool) +/- 100 feet above the perforations and pumping a sufficient volume of cement into the perforations, or 3) setting a bridge plug (a tool similar to a cement retainer except that no fluid can pass in either direction) +/- 100 feet above the perforations and placing 50 feet of cement on top of the bridge plug. The production casing may be removed. If the casing is cut and removed, the casing stub (the top of the casing remaining in the hole) must be plugged with a 100 foot cement plug to extend 50 feet inside the casing stub and 50 feet outside the casing stub (open hole). If casing is removed, the surface casing is plugged as described under open hole situations. If the casing is not removed, the surface casing shoe must be isolated by perforating the production casing near the surface casing shoe. A cement retainer must be set +/- 100 feet above the perforations and a sufficient volume of cement is pumped below the retainer, through the perforations, and between the outside of the production casing and the inside of the surface casing for a distance of 100 feet. All cement plugs must have sufficient volume to fill 100 feet of hole plus an additional volume of 10 percent per 1000 feet of depth (a 100 foot plug at 5000 feet would be required to have an additional 50 feet of cement). At the surface, all annular spaces must be plugged with at least 50 feet of cement. No tagging of the surface casing shoe plug is required if the plug was placed through a cement retainer. All cement retainers of bridge plugs must be capped with a minimum of 50 feet of cement.

A permanent abandonment marker is required on all wells unless waived by the Forest Service. This marker pipe is usually 4 feet above the ground and embedded in cement at the borehole site. The pipe is capped and the wells identity and location permanently inscribed.

Dry wildcat and development wells are normally plugged before the drill rig is removed from the wellsite. This allows the drill rig to plug the hole and avoid the necessity of bringing in other plugging equipment.

Before a lessee/operator abandons a well no longer capable of production, it must be shown that it is no longer suitable for profitable operation. Wells are normally plugged when they are no longer capable of production. However, if a well has potential for use in a secondary recovery program, it may be allowed to stand idle. Truck-mounted equipment is used to plug former producing wells.

b. Surface Reclamation - A reclamation plan is a part of the surface use plan of operations. Reclamation may be required of any surface previously disturbed that is not necessary for the continued well or other operations. When abandoning a well and other facilities that do not have a previously approved reclamation plan, a plan must be submitted with a Notice of Intent to Abandon (NIA). Additional reclamation measures may be required based on the conditions existing at the time of abandonment. Any additional reclamation requirements are made part of the conditions of approval of the NIA. The general standards and guidelines for reclamation and abandonment of oil and gas operations are set forth in the third edition of the Surface Operating Standards for Oil and Gas Exploration and Development. Additional standards and requirements may be applied to accommodate the site-specific and geographic conditions of the reclamation site.

Prior to the start of reclamation, all equipment and trash must be removed from the wellsite or the area to be reclaimed. When an entire lease is abandoned, the separators, heater treaters, tanks, and other processing and handling equipment are removed and the surface restored. Flowlines and injection lines installed on the surface are removed, but buried lines usually are left in place.

Wellsite Reclamation - Wellsite reclamation must be planned on both producing and abandoned wellsites. The entire site, or portion not required for the continued operation of the well, is reclaimed.

When they are dry, all excavations and mud pits must be closed by backfilling and graded to conform to the surrounding terrain. Waterbreaks and terracing may be installed to prevent erosion of fill material.

Cut and fill slopes must be reduced and graded to blend the site to the adjacent terrain. The wellsite may be recontoured by bringing the construction material back onto the well pad and reestablishing the natural contours where desirable.

The topsoil is replaced on the reclamation area and prepared to provide a seedbed for reestablishment of desirable vegetation. Standard reclamation practices may include contouring, terracing, gouging, scarifying, mulching, fertilizing, seeding, and/or planting.

Reserve Pit Reclamation - All pits must be reclaimed to a natural condition similar to the rest of the reclaimed wellsite area. In addition, the reclaimed pit must be restored to a safe and stable condition. In most cases, if a pit contains a synthetic liner, the pit is not to be trenched (cut) or filled while still containing fluids. Pits must be allowed to dry, be pumped dry, or solidified by adding cement in situ prior to backfilling. The pit area is usually mounded to allow for settling. The mounding allows for positive surface drainage off the reclaimed pit, which lessens the possibility of leaching or lateral movement of undesirable substances from the buried pit into surface streams or shallow aquifers.

The concentration of hazardous substances in the reserve pit at the time of pit backfilling must not exceed the standards set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). All oil and gas drilling-related CERCLA hazardous substances removed from a location and not reused at another drilling location are disposed of in accordance with applicable state and Federal regulations.

Road Reclamation - Roads no longer needed for oil and gas operations and not within the Forest Service Transportation System must be abandoned, closed, and obliterated. Reclamation of abandoned roads will involve one or more of the following techniques: (1) recontouring to the original contour; (2) recontouring to blend with natural contours; (3) recontouring only selected sections of the roadway; and (4) obliteration of the roadway surface with no other modification of the road profile. Reclamation treatments may also include ripping, scarifying, water-barring, and barricading. Stockpiled soil, debris, and fill materials are replaced on the roadbed and the road reseeded in accordance with the approved site-specific reclamation plan.

Pipeline and Flowline Reclamation - Abandonment and reclamation of pipelines and flowlines, similar to the reclamation of abandoned roads involve replacing fill material in the original cuts, reducing and grading cut and fill slopes to conform to the adjacent terrain, replacement of surface soil material, waterbarring and revegetating in accordance with the reclamation plan.

Pipeline trenches are compacted during backfilling and must be maintained to correct backfill settling and prevent erosion. Waterbars and other erosion control devices are repaired or replaced as necessary.

Revegetation - Disturbed areas are revegetated after the site has been contoured, graded, and the soil surface satisfactorily prepared. In order to minimize the soil erosion potentials and provide a stable seed bed, site preparation may include ripping, contour furrowing, terracing, reduction of steep cut and fill slopes, waterbarring, etc. Revegetation involves seeding, planting of containerized plants, or a combination of the two. Native perennial species, or other plant materials specified by the Forest Service are used. The oil and gas operator is advised as to species, methods of revegetation and seasons to plant. Seeding is normally done by drilling on the contour or by other approved methods. Seeding and/or planting is repeated until satisfactory revegetation is accomplished, as determined by the Forest Service. Mulching, fertilizing, fencing, or other practices may also be required depending on site-specific conditions.

Visual Resources - For all activities which alter landforms, disturb vegetation, or require temporary or permanent structures, the operator is required to comply with visual resource management objectives for the area. Site-specific mitigation practices may be required by the Forest Service to avoid or minimize changes in the character of the landscape or minimize the impacts of unnatural intrusions on the landscape.

Additional Requirements - Additional reclamation methods and techniques that reflect local site conditions are required. Technical advances in reclamation practices that may be successfully applied to oil and gas construction are continually being developed.

2. Inspection and Final Abandonment Approval

Final abandonment is not approved until the surface reclamation work required by the APD or NIA is completed and the required reclamation is acceptable to the Forest Service. The operator must file a Subsequent Report of Abandonment (SRA) following the plugging of a well. A Final Abandonment Notice (FAN) which indicates that the site is ready for inspections must be filed upon completion of reclamation.

3. Release of Bonds

If the well is covered by an individual lease bond, the period of liability on that bond is terminated once the final abandonment or phased bonding release has been approved. The principal can request termination of the period of liability from the BLM State Office holding the bond. If the well is covered by a statewide or nationwide bond, termination of the period of liability of these bonds is not approved until final abandonment of all activities conducted under the bond have been approved by both the BLM and Forest Service.

APPENDIX D

CONDITIONS OF APPROVAL

CONDITIONS OF APPROVAL

A Condition of Approval (COA) is generated at the time of site specific analysis when a Surface Use Plan of Operations for drilling of a well has been received. A COA's purpose is to offer mitigation specific to the proposal, i.e. soil erosion reduction, ground water protection, selection of vegetation favorable to wildlife and domestic livestock, etc.

COAs may not unduly hinder or preclude the lessee's/operator's opportunity to exercise valid existing rights. COAs may only be applied if they are consistent with the lease terms or their use has been accepted through negotiation.

COAs may be applied to all oil and gas activities, including associated access routes and/or rights-of-way. The Authorized Forest Officer may select from the list of COAs found below, adjust them as conditions warrant, or may even develop new COAs if the site specific analysis identifies conditions not addressed by currently available COAs.

COAs are not added to drilling permits if they are unnecessary or duplicate efforts already contained in the lessee's/operator's submittal.

The list below is not intended to be all inclusive and, again, any of the listed COAs may be adjusted or new ones developed to fit the specific situation for which it is to be applied.

CONDITIONS OF APPROVAL (COA)	ADMINISTRATIVE/MITIGATION OBJECTIVE(S)
CONSTRUCTION	
1. Single-lane access roads will be constructed and maintained according to a Forest Service typical profile and specification as indicated on the attached Exhibit A (General Road Construction and Rehabilitation Specifications), and Exhibit B (Standard Construction and Maintenance Specifications, and Road Data Sheet). The access road shall be accepted by the Forest Service prior to moving equipment onto location. In the event that construction activity occurs during winter conditions, the construction requirements may be modified for winter time access, the road will be completed to final standards within the next six months.	Applies to access road needed for the drilling locations. Use of this COA ensures that proper engineering practices for protection of soil and water resources and safety procedures will be followed. Also ensures that access roads be accepted before moving equipment onto location. Meets Custer National Forest Management Plan Standards (CNFMPS) 11. a. 1)-4), pages 36-38.
2. The access road to this well will have a complete survey and design and shall be approved by the Forest Service Engineering Section prior to construction. Design(ed) section(s) will be construction staked to ensure compliance with the survey and design. Cut and fill stakes are to remain in place after construction. All design construction will be under the direct supervision of a registered engineer to to be provided by the operator. The access road shall be accepted by the Forest Service prior to moving equipment onto the location. The permanent access road(s) will be constructed and maintained according to Forest Service approved specifications as indicated on the attached Exhibit A (General Road Construction and Rehabilitation Specifications), and Exhibit B (Standard Construction and Maintenance Specifications, and Road Data Sheet). In the event that construction activity occurs during winter conditions, the construction requirements may be modified to provide access and minimize environmental damage. In those cases where the project is modified for winter time access, the road will be completed to final standards within the next six months.	Applies to access road needed for the drilling location. Use of this COA ensures that proper engineering practices for protection of soil and water resources and safety procedures will be followed. Also ensures that access roads be accepted before moving equipment onto location. Meets CNFMPS 11. a. 1)-4) pages 36-38.

CONSTRUCTION	
3. The operator has the option to construct the road to temporary standards during the drilling phase of the well according to the specifications in attached Exhibit C (Temporary Road Guidelines).	Applies to access road needed for the drilling location. Use of this COA ensures that proper engineering practices for protection of soil and water resources and safety procedures will be followed. Meets CNFMPS 11 a. 4) b) pages 36-38.
4. The off-lease portion of the access road through Section __ , T __ S, R __ E, will require a Forest Service special use permit for road construction. No construction activity will commence until the operator receives this approved permit.	Identifies that a special use permit is needed for off-lease access road and also enforces that no construction will take place until a special use permit is granted. Meets CNFMPS 8. c. 6) and d. 3) page 28 and 10. b. 2) e) page 34.
5. The production facilities and tanks for this well will be located at the on-site facility in __ - __ of Section _ , T __ S, R __ E. The location of the flowlines and facility site will be agreed to and staked with approval of the Forest Service.	Identifies that production facilities are located off the drill pad and the site and flowlines need to be staked and approved.
6. A prework conference shall be held prior to any earth disturbing activities and a starting date established. This will include, at a minimum, the operator or his/her authorized representative, the dirt contractor, and the authorized Forest Service officer. The lead operator is responsible for scheduling and holding this meeting in a timely manner sufficient for resolving any potential problems prior to actual construction. The Forest Service shall be notified in the event the established stating date is changed. The Forest Service will then determine if another prework conference is necessary.	Usually done with road access and well staked and any problem areas discussed. To ensure resource mitigation and/or protection identified in the Decision Notice/Record of Decision is noted by the operator prior to ground disturbance. Required by Onshore Operating Order #1.
7. The operator will provide the dirt contractor with a copy of Forest Service Standard Specifications for Construction of Roads and Bridges (EM-7720-100) (see Exhibit B) along with everything referenced in Stipulation 1 or 2, whichever is applicable. Construction operations may be suspended if the contractor fails to have these document on-site.	Requires contractor to have a copy of Forest Service Standard Specifications for Construction of Roads and Bridges (EM-7720-100) with Exhibit B telling which specifications apply to this project. Mitigates soil and erosion disturbance.

CONSTRUCTION	
8. If, prior to or during construction, items of archeological, paleontological, or historic value are reported or discovered, or an unknown deposit of such items is disturbed, the operator will immediately cease construction in the affected area and notify the Forest Service. Construction will not resume until approval is given by the Forest Service.	Although archeological clearance is required, this COA adds more responsibility to the operator to protect archeological, paleontological or historic resources.
9. The operator is responsible for locating and protecting underground pipelines and electric transmission lines.	To ensure the public safety and uninterrupted service, to prevent fires due to explosion of accidentally released gasses or cut electric transmission lines the operator, not the Forest Service, must locate and protect underground pipelines and electric transmission lines.
10. The operator shall protect, in place, all public land survey monuments, private property corners, and Forest Service boundary markers. In the event that any land markers or monuments are destroyed in the exercise of their rights, depending on the type of monument destroyed, the operator shall see that they are re-established or referenced in accordance with (1) the procedures outlined in the "Manual of Instructions for the Survey of the Public Land of the United States," (2) the specifications of the county surveyor, or (3) the specifications of the Forest Service.	To maintain an ordered land monument system this COA requires re-establishment of a disturbed public land survey monuments, private property corners, and Forest Service boundary markers, by the operator.
11. No aggregate or surfacing material will be taken from Forest Service lands without a mineral materials sale permit.	Surfacing material cannot be utilized without the issuance of a Contract For The Sale of Mineral Materials permit, Forest Service form FS 2800-9 (12/89).
12. If a reserve pit is utilized a liner will be required. The liner will have a burst strength of not less than 140 psi. If the reserve pit is excavated in porous materials (i.e. glacial debris, sand, etc.) the porous materials will be covered with six-inches of clay before the liner is installed. This may require re-sloping of the pit walls. No trash will be disposed of in the reserve pit.	A reserve pit liner is used to prevent loss of drilling fluids which may have the potential to destroy vegetation and to contaminate surface and ground water supplies. To maintain the integrity of the pit liner during the drilling of the well the clay is required where the surface of the pit has the potential to puncture the liner. Likewise, in order to maintain the integrity of the pit liner, the disposal of trash in the reserve pit is prohibited. Meets CNFMPS8. c. 4) a) and b) page 27.

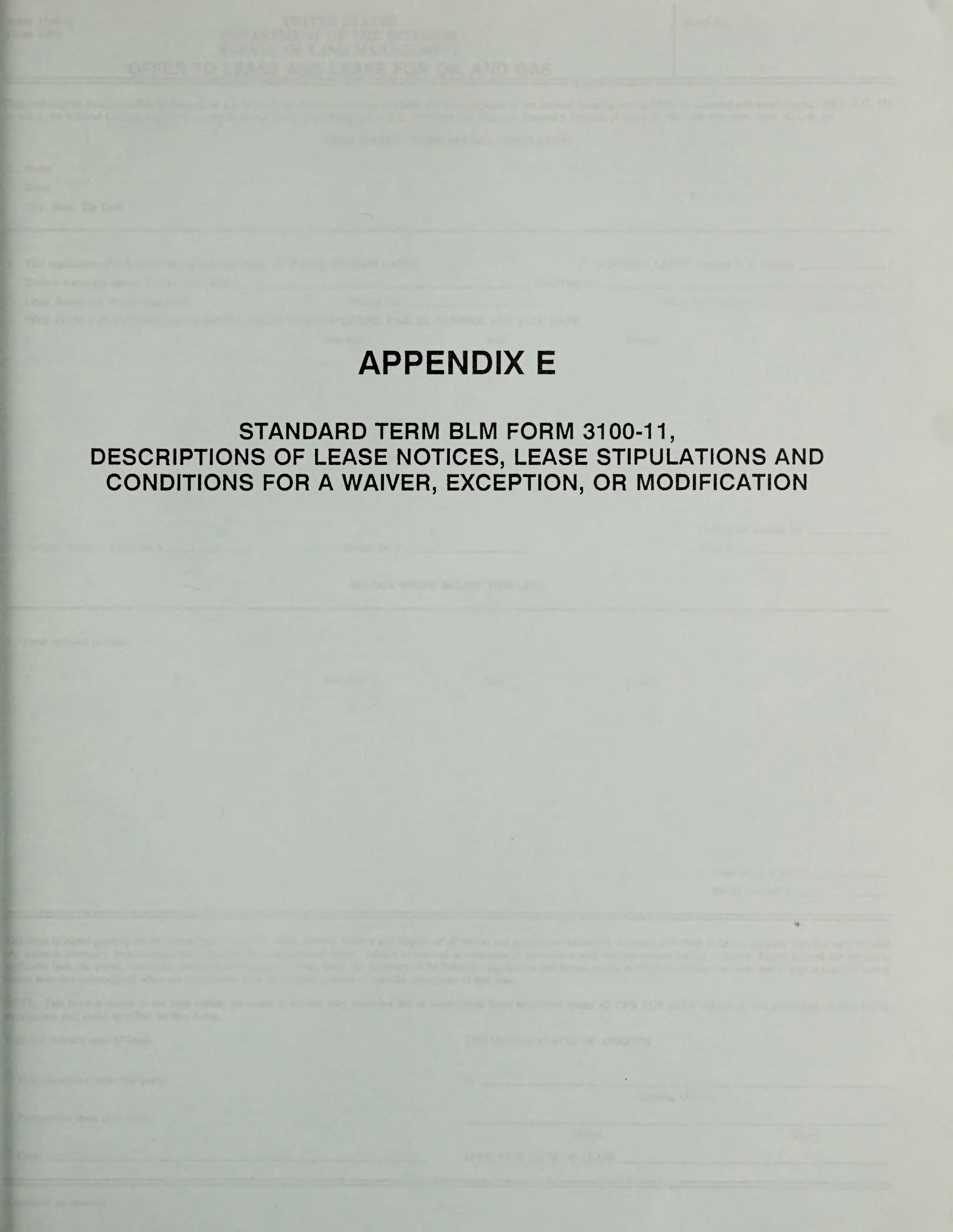
DRILLING OPERATIONS	
13. The reserve pit will be fenced on the three non-working sides during drilling. After drilling is completed, the fourth side of the pit will be fenced until the pit is reclaimed. Fencing, screening, and netting of pits is *advised* where open storage vessels, earthen pits, or ponds may contain oil, oil residue, or waters with more than 15,000 parts per million (ppm) total dissolved solids. This measure is intended to prevent death or injury to birds and mammals. Upon completion of drilling the entire disturbed location will be fenced after seeding. Fences and cattleguards must meet Forest Service specifications. Once the location has been rehabilitated and vegetation re-established, the fence will be removed or the fenced area reduced as required by the Forest Service.	Prevents entry into the livestock reserve pit by domestic livestock and/or wild animals. Responds to U.S. Fish and Wildlife Service concern regarding potential hazard that reserve pit fluids represent to migrating waterfowl and small mammals. After seeding the disturbed location is fenced to allow establish vegetation on the area disturbed by operations and which, in the case of a producing well, will not be utilized for production. Re-vegetation is essential to erosion control and returning the area to a productive base for wildlife and domestic livestock. Meets CNFMPS 8. c. 4) i) page 28.
14. Production water or testing tanks shall be located and/or diked so that any spilled fluids will flow into the reserve pit or a catchment basin if no reserve pit is being used. Production water tanks will not be placed on topsoil stockpiles.	Fluids generated by well testing have the potential to adversely affect vegetation and water quality. The use of diking is a measure to control accidental spills or releases of fluids produced during well testing. No tanks allowed on topsoil stock piles to lessen any chance of topsoil, to be used in site reclamation, contamination. Meets CNFMPS 8. c. 4) f) and g) pages 27 and 28.
15. Portable dumpsters will be used for all trash. All trash will be hauled off-site, no burning will be allowed.	To ensure that trash generated by drilling operations is disposed of in an approved landfill as well as to lessen chances of adverse effects to air and water quality. Meets CNFMPS 8. c. 4) b) page 27.
16. Sewage will be disposed of according to county and state requirements in a portable chemical toilet or in a home at least 15 feet deep excavated in the cut portion of the well pad.	To prevent contamination of water resources.
17. The operator shall notify the District Ranger of the rig release date within two working days of that date. The drilling rig shall be removed from the location within 30 days of the completion of drilling unless prior approval is granted by the Forest Service; no rig stacking is allowed on Forest Service System lands without permit.	The storage of unused drilling equipment on Forest Service System lands requires a special use permit. Meets CNFMPS 10. b. 2) l) page 35.

PRODUCTION FACILITIES	
18. If a tank battery is constructed, each and every tank setting, treater, and separator must be surrounded on all four sides by an impermeable dike/berm of sufficient capacity to adequately contain the contents of the largest vessel within the dike plus one day's production. Load lines must terminate within the dike.	In case of a tank battery spill the diking will contain the spill. This serves to limit the area of contamination, facilitate clean up, and to lessen potential adverse affectation, wildlife, and water quality. Meets CNFMPS 8. c. 4) g) page 28.
19. All vent lines must terminate within the diked area or be designed so that no liquids can flow out of the vent lines.	This is to insure that oil liquids are contained within the diked area, thereby limiting the area of potential contamination, to facilitate clean up, and to lessen potential adverse affects to vegetation, wildlife and water quality. Meets CNFMPS 8. c. 4) g) page 28.
20. All internal combustion engines associated with production facilities will be equipped with noise-reducing mufflers.	Reduces noise generated by a location.
21. All above-ground facilities will be painted earthtone colors (Munsell Soil Color) **{COLOR TO BE DETERMINED AT TIME OF DRILLING PERMIT ONSITE REVIEW}** within six months of the well completion.	To minimize visual impact and to achieve visual management objectives. Meets CNFMPS 8. c. 4) h) page 28.
22. The operator must maintain vegetative control on the area of operation including a 30 foot minimum bare ground area around any flame source. The operator shall maintain the area to be cleared by means of chemicals only after the Forest Supervisor has given specific written approval. Application for such approval must be in writing and must specify the time, method, chemicals and the portion of the area to be chemically treated.	Reduce fire hazard potential around open flames and to prevent the use of chemical herbicides that may have an adverse effect on vegetation and wildlife and/or may not be approved for use on lands administered by the Federal Government. Meets CNFMPS 5. e. 3) page 24 and 8. c. 8) page 28.
23. An lessee/operator developed and Forest Service approved fire prevention and suppression plan will be part of the drilling permit.	Fire prevention plan to reduce fire hazards and specify needed fire equipment. Meets CNFMPS 12. b. 3) d) page 39.
24. No permanent above ground pipelines will be approved between the well head and treater or between the treater and flare pit.	Eliminates sources of potential accidental fluid release which might have an adverse affect on vegetation, wildlife and water quality.
25. Outdoor area lighting fixtures will be allowed on production facilities and may only be used when personnel are present on location.	Mitigates unnecessary lighting at night so as to meet visual management objectives. Meets CNFMPS 8. c. 4) h) page 28.

PRODUCTION FACILITIES	
26. All spills (produced water or oil) or pipeline breaks outside the diked area shall be reported within 24 hours to the Forest Service.	Timely notification allows for immediate attention by the Forest Service. Meets CNFMPS 8. e. 1)-3) and 8. f. 1)-2) page 28.
27. As built survey plats will be submitted to the U.S. Forest Service upon completion of construction of all roads and pipelines, and will be prepared in accordance to attached requirements Exhibit D.	Ensures the Forest Service has a final plat of the completed project. Where applicable, the submitted information will be included in the Forest transportation and Forest/District maps. Meets CNFMPS 11. a. 3) a) page 37.

REHABILITATION	
28. Seed mixtures to be used in rehabilitating this site will be provided by the Forest Service. The mixture shall be certified weed free; a copy shall be supplied to the Forest Service prior to planting. Seeding will be accomplished during the spring or fall seeding period as directed by the Forest Service.	Seed mixtures are site specific for land forms and are used to reduce soil erosion and provide immediate vegetative cover. For best effects seeding is usually done in April-May or mid-September to mid-November. Meets CNFMPD 8. c. 4) 5) page 28.
29. If this well is a producer, all site rehabilitation shall be completed within six months. As a general guideline, under normal weather conditions the timetable for rehabilitation will allow two months for the mud to settle in the reserve pit, two months for backfill settling upon pit closure, and two months to complete final re-contouring and spreading of topsoil. Before any production facilities are constructed, a site reclamation plan will be prepared by the operator and Forest Service for all disturbed areas not required for production facilities. "Trenching" of the reserve pit during the pit reclamation phase will not be allowed unless approved in the site reclamation plan. In the event of winter freeze-up, reclamation will be put on hold as determined by the Forest Service. A prework conference between the Forest Service and the lessee/contractor is required for all phases of site reclamation.	Ensures timely restoration of site and reclamation of reserve pit and any unused portions of well site to mitigate soil erosion and to return the site to a condition more favorable to wildlife and domestic livestock. Meets CNFMPS 8. c. 4) 5) page 28.
30. At the Forest Service request, the operator will provide an inventory of the kinds and amounts of all chemical, additives, and substances used in drilling.	Information essential to a historical inventory of substances utilized in the drilling of a well. Meets CNFMPS 8. f. 1) and 2) page 28.

REHABILITATION	
31. At such time as the well is abandoned, the operator shall contact the Forest Service for development of the final reclamation plan.	Ensures timely Forest Service involvement in the development of a final rehabilitation plan. The plan must consider means to prevent soil erosion, adverse affects to water quality, and to return the site to a condition productive to wildlife and domestic livestock. Meets CNFMPS 8. c. 5) page 28.
32. If this well is a non-producer, the entire location and access road will rehabilitated within six months from the date the well is plugged. The rehabilitation timetable will be the same as in stipulation number 29 above.	Ensures timely restoration of site after abandonment and requires seed mixture approval of the Forest Service. As a result, potential soil erosion will be reduced and the site will be returned to a condition productive to wildlife and domestic livestock more quickly. Meets CNFMPS 8. c. 5) page 28.
33. If this well site is constructed and not drilled, the site and access road must be reclaimed or Forest Service approved special erosion control measures implemented within 90 days of site construction unless otherwise approved in writing by the District Ranger.	Reduces potential soil erosion, adverse affects to water quality, and more quickly returns the site to a condition productive to wildlife and domestic livestock. Meets CNFMPS 8. c. 5) page 28.
34. If this well site is temporarily abandoned after drilling, rehabilitation will be completed within six months according to the specifications set forth in stipulation number 29 above.	Reduces potential soil erosion, adverse affects to water quality, and more quickly returns the site to a condition productive to wildlife and domestic livestock. Meets CNFMPS 8. c. 5) page 28.
35. At such time as the well is abandoned, the operator is required to identify the well location with the appropriate information as required by state law. Said information will be placed on a flat plate, or survey marker, attached to the well casing so the marker is buried from two to six feet below the re-contoured surface. The plate/marker sealing the casing is required to have a "weep hole" (1/8"-1/4") which will allow pressure to dissipate and facilitate detection of any fluid seepage.	Buried abandoned well markers meets visual management objectives and the "weep hole" in the casing will allow for the detection of fluid seepage which could result in adverse affects to water quality. Meets CNFMPS 8. c. 4) h) and 8. f 1)-2) page 28.



APPENDIX E

STANDARD TERM BLM FORM 3100-11, DESCRIPTIONS OF LEASE NOTICES, LEASE STIPULATIONS AND CONDITIONS FOR A WAIVER, EXCEPTION, OR MODIFICATION

Form 3100-11
(June 1988)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OFFER TO LEASE AND LEASE FOR OIL AND GAS

Serial No.

The undersigned *(reverse)* offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 Op. Atty. Gen. 41), or the

READ INSTRUCTIONS BEFORE COMPLETING

1. Name
Street
City, State, Zip Code

2. This application/offer/lease is for: *(Check only One)* ☐ PUBLIC DOMAIN LANDS ☐ ACQUIRED LANDS (percent U.S. interest ______)

Surface managing agency if other than BLM: ______ Unit/Project ______

Legal description of land requested: *Parcel No.: ______ *Sale Date (m/d/y): ___ / ___ / ___

***SEE ITEM 2 IN INSTRUCTIONS BELOW PRIOR TO COMPLETING PARCEL NUMBER AND SALE DATE.**

T. R. Meridian State County

Total acres applied for ______

Amount remitted: Filing fee $ ______ Rental fee $ ______ Total $ ______

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

Total acres in lease ______

Rental retained $ ______

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas *(except helium)* in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3120 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term of lease:

☐ Noncompetitive lease (ten years)

☐ Competitive lease (five years)

☐ Other ______

THE UNITED STATES OF AMERICA

by ______
(Signing Officer)

______ ______
(Title) (Date)

EFFECTIVE DATE OF LEASE ______

(Continued on reverse)

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof; (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect in either public domain or acquired lands do not exceed 246,080 acres in Federal oil and gas leases in the same State, of which not more than 200,000 acres are held under option, or 300,000 acres in leases and 200,000 acres in options in either leasing District in Alaska; (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)(2)(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this ____________ day of ____, 19 ________. ____

(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

(a) Noncompetitive lease, $1.50 for the first 5 years; thereafter $2.00;
(b) Competitive lease, $1.50; for primary term; thereafter $2.00;
(c) Other, see attachment, or
as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due at the rate specified in (a), (b), or (c) for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations on production removed or sold. Royalty rates are:

(a) Noncompetitive lease, 12½%;
(b) Competitive lease, 12½%;
(c) Other, see attachment; or
as specified in regulations at the time this lease is issued.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties shall be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production shall be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee shall not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor shall lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in lieu of rental of not less than the rental which otherwise would be required for that lease year shall be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge shall be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (30 U.S.C. 1701). Lessee shall be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

Sec. 3. Bonds—A bond shall be filed and maintained for lease operations as required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall exercise reasonable diligence in developing and producing, and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations—To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium—Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee shall include in any contract of sale of gas the provisions of this section.

Sec. 9. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity—Lessee shall: pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee shall comply with section 28 of the Mineral Leasing Act of 1920.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time. Lessee shall be subject to applicable provisions and penalties of FOGRMA (30 U.S.C. 1701).

Sec. 14. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

★U.S.GPO:1988-0-573-017/98032

STANDARD LEASE TERMS OF BLM FORM 3100-11

Standard lease terms apply to all leases. They are attached as Exhibit 1. They require that the "lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, visual, and other resources, and to other land uses or users." Standard lease terms are commonly considered to be adequate to mitigate most adverse environmental impacts (40 CFR Part 1505.2(c) and Part 1508.20). They are common to all leases, and therefore to all management alternatives being analyzed. They also apply to all non-discretionary statutes, and reasonable measures required by the authorizing officer to minimize adverse impacts to other resources and users.

Under Section 6 "Conduct of Operations" the BLM regulations (43 CFR 3101.1-2) state that for the Standard Terms environmental protection clause a specific drill site location may be moved up to 200 meters (656 feet). This is approximately 0.12 mile. Operationally this means on a linear resource, such as riparian areas, it is possible to protect the area by moving a proposed well site approximately 0.12 mile from the boundary of the riparian area. For a small occupancy site that could be considered a point location, such as an identified cultural site or small T&E plant site, the site can be protected by a 0.12 mile radius circle. This amounts to approximately 31 acres potential protection for such resources. Additionally these regulations allow the prohibition of new surface disturbing operations for a period not to exceed 60 days in any lease year.

LEASE NOTICES

Lease Notices are attached to leases to transmit information at the time of lease issuance to assist the lessee in submitting acceptable plans of operation, or to assist in administration of leases. Lease Notices are attached to leases in the same manner as stipulations, however, there is an important distinction between Lease Notices and Stipulations. Lease Notices do not involve new restrictions or requirements. Any requirements contained in a Lease Notice must be fully supported in either a law, regulation, standard lease term, or onshore oil and gas order. A Lease Notice is not signed by the lessee. Guidance in the use of Lease Notices is found in BLM Manual 3101 and 43 CFR 3101.1-3.

If a situation or condition is known to exist that could constrain lease operations, there should be full disclosure at the time of lease issuance via a Lease Notice. If a lessee may be prevented from extracting oil and gas through a prohibition mandated by a specific non-discretionary statute, such as the Endangered Species Act, then a stipulation may be used even though a Lease Notice might be sufficient. It is at the discretion of the authorized Forest officer whether a situation is sufficiently sensitive to warrant the use of a lease stipulation.

Acronyms are used throughout this Appendix. Complete descriptions of the acronyms are found in the Glossary or list of acronyms at the beginning of the document. The following acronyms are used in the remainder of this chapter:

MA = Management area
LN = Lease Notice
NL = No Leasing
NA = Not available for lease
ST = Standard Terms of Form 3100-11
NSO = No Surface Occupancy stipulation
TL = Timing Limitation stipulation
CSU = Controlled Surface Use stipulation

For this analysis, Lease Notices that would be applied to all action alternatives are as follows:

TABLE E-LN1
Summary of Lease Notice for Sensitive Plants
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Sensitive plant habitat	B-Bad Canyon	LN	LN	LN	LN	LN
	B-Black Butte	LN	LN	LN	LN	LN
	B-Butcher Cr.	LN	LN	LN	LN	LN
	C-Palisades	LN	LN	LN	LN	LN
	C-Line Cr.	LN	LN	LN	LN	LN
	C-Cooke City	LN	LN	LN	NL	LN
	D-Picket Pin	LN	LN	LN	LN	LN
	D-Fishtail	LN	LN	LN	LN	LN
	D-Butcher Creek	LN	LN	LN	LN	LN
	D-Palisades	LN	LN	LN	LN	LN
	D-Line Creek	LN	LN	LN	NA	LN
	E-Stillwater	LN	LN	LN	LN	LN
	F-ALL*	LN	LN	LN	NA	LN
	G-Red Lodge	LN	LN	LN	LN	LN
	P-ALL	LN	LN	LN	LN	LN
	R-W. Fk. Rock Cr.	LN	LN	LN	NA	LN
	T-Scenic Byway	LN	LN	LN	NA/LN**	LN

* Not known to occur in MA F-Palisades and Rock Cr.

**MA-T is NA south of US 212 and for a .5 mile buffer to the north. North of the buffer those land available will have a Lease Notice.

TABLE E-LN2
Summary of Lease Notice for Sensitive Plant Sites
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Sensitive plant sites	D-Line Cr.	NSO*	NSO*	LN	NA	LN
	F-E. Rosebud	NSO*	NSO*	LN	NA	LN
	T Scenic Byway	NSO*	NSO*	LN	NA	LN

* See also Table E-S2 for stipulations.

TABLE E-LN3
Summary of Lease Notice for Grizzly Bear
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Grizzly MS 2	C-Cooke City	NSO*	TL* 6/1 thru 11/1	TL* 6/1 thru 11/1	NL	LN

*See also Table E-SN3 for stipulations.

TABLE E-LN4

Summary of Lease Notice for Yellowstone Cutthroat Trout

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Yellowstone Cut-throat trout (YCT) (presumed)	B-Little Rocky	LN	LN	LN	LN	LN
	C-Cooke City	LN	LN	LN	NL	LN
	F-Woodbine	LN	LN	LN	NA	LN
	F-Rock Cr.	LN	LN	LN	NA	LN
	G-Red Lodge	LN	LN	LN	LN	LN
	T-Scenic Byway	LN	LN	LN	NA	LN

See also Table E-S11 for stipulations for verified pure strain YCT.

TABLE E-LN5

Summary of Lease Notice for Bald Eagle Habitat

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Bald Eagle	B-Black Butte	LN	LN	LN	LN	LN
	C-Stillwater	LN	LN	LN	NL	LN
	D-Picket Pin	LN	LN	LN	LN	LN
	D-Fishtail	LN	LN	LN	LN	LN
	D-Palisades	LN	LN	LN	LN	LN
	E-Stillwater	LN	LN	LN	NA	LN
	F-West Rosebud	LN	LN	LN	NA	LN
	F-East Rosebud	LN	LN	LN	NA	LN
	F-Rock Creek	LN	LN	LN	NA	LN

TABLE E-LN6

Summary of Lease Notice for Peregrine Falcon Habitat

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Peregrine Falcon	B-Bad Canyon	LN	LN	LN	LN	LN
	B-Little Rocky	LN	LN	LN	LN	LN
	B-Black Butte	LN	LN	LN	LN	LN
	B-Butcher Creek	LN	LN	LN	LN	LN
	C-Picket Pin	LN	LN	LN	LN	LN
	C-Stillwater	LN	LN	LN	NL	LN
	C-Line Creek	LN	LN	LN	LN	LN
	D-Fishtail	LN	LN	LN	LN	LN
	D-Picket Pin	LN	LN	LN	LN	LN
	D-Fichtail	LN	LN	LN	LN	LN
	D-Butcher Creek	LN	LN	LN	LN	LN
	D-Palisades	LN	LN	LN	LN	LN
	D-Line Creek	LN	LN	LN	NA	LN
	E-Stillwater	LN	LN	LN	LN	LN
	F-Woodbine	LN	LN	LN	NA	LN
	F-Grizzly Peak	LN	LN	LN	NA	LN
	F-Palisades	LN	LN	LN	NA	LN
	G-Red Lodge	LN	LN	LN	LN	LN
	R-W. Fk. Rock Creek	LN	LN	LN	NA	LN
	T-Scenic Byway	LN	LN	LN	NA/LN*	LN

*T Scenic Byway is split in this alternative.

Threatened, Endangered, and Sensitive Plant or Animal Species Lease Notice: A lease area may contain habitat necessary for the continued existence of the threatened and endangered species listed below, which are protected by the 1973 Endangered Species Act (as amended). The lease area may also contain habitat or species, listed as sensitive, which may require protective measures to prevent them from being listed as threatened or endangered. A biological evaluation of the leased lands may be required prior to surface disturbance to determine if threatened, endangered, or sensitive plant or animal species or their habitat are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

1. Contact the Forest Service to determine if a biological evaluation is required. The Forest Service is responsible for ensuring that the leased land is examined through a biological evaluation, prior to undertaking any surface-disturbing activities, to determine effects upon any plant or animal species listed or proposed for listing as threatened, endangered, or sensitive.

2. The Lessee or operator may choose to conduct the evaluation on the leased lands at their discretion and cost. This biological evaluation must be done by or under the supervision of a qualified resource specialist approved by the Forest Service. An acceptable report must be provided to the Forest Service identifying the anticipated effects of a proposed action on threatened, endangered, or sensitive species. An acceptable biological evaluation is to be submitted to the Forest Service for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

3. Implement mitigation measures required by the Forest Service. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and extensive recordation. The findings of the biological evaluation may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the 1973 Endangered Species Act (as amended), by detrimentally affecting threatened or endangered species or their habitats.

If threatened, endangered, or sensitive plant or animal species are discovered in the area after any required biological evaluation has concluded, an evaluation will be conducted to assess the effect of ongoing and proposed activities. Based on the conclusion drawn in the evaluation, additional restrictions or prohibitions may be imposed to protect the species or their habitats.

Authorities: Endangered Species Act of 1973 (as amended), Section 6 of the Oil and Gas Lease Terms (Form 3100-11), 50 CFR 402, 36 CFR 219.19, and 36 CFR 219.26, and the Forest Plan as required by the National Forest Management Act of 1976.

Riparian/Wetlands/Floodplains Lease Notice: Riparian, Wetland, and Floodplain areas occur mostly as small, narrow features. These areas are important in maintaining vital and diverse habitat for many wildlife, fish, and plant species, and maintaining stream channels and shorelines often stabilized by the riparian zone.

Forest Plan Management Area M, the riparian ecosystem, will be managed to provide healthy, self-perpetuating plant and water communities that have optimum diversity and density of understory and overstory vegetation. Occupancy and use of lands within Management Area M proposed in a Surface Use Plan of Operations will be considered in an environmental analysis done to identify the mitigation measures necessary to protect the riparian area. Measures such as road design, well pad location and size and the use of directional drilling would be considered in the permit authorizing the activity.

Authorities: Executive Order 11990 - Protection of Wetlands, Executive Order 11988 - Floodplain Management, 36 CFR 219.23, 36 CFR 219.27(e), and the Forest Plan as required by the National Forest Management Act of 1976.

Cultural Resources Lease Notice: An inventory of the leased lands may be required prior to surface disturbance to determine if cultural resources are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall:

1. Contact the Forest Service to determine if a cultural resource inventory is required. If an inventory is required then:

2. The Forest Service will complete the required inventory; or the lessee or operator may choose to engage the services of a cultural resource consultant acceptable to the Forest Service to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the standard 10-acre minimum to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the Forest Service for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

3. Implement mitigation measures required by the Forest Service. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the Forest Service, surface occupancy on that area must be prohibited. The lessee or operator shall immediately bring to the Forest Service any cultural resources discovered as a result of approved operations under this lease and shall not disturb such discoveries until directed to proceed by the Forest Service.

Authorities: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural properties eligible to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that minimizes adverse impacts to cultural and other resources. Other authority includes the Forest Plan as required by the National Forest Management Act of 1976.

Land Use Authorizations Lease Notice: Land Use Authorizations incorporate specific surface land uses allowed on Forest Service administered lands. These authorizations include rights-of-ways, leases, and permits. The existence of such land use authorizations shall not preclude the leasing of oil and gas.

The specifically authorized acreage for land use should be avoided by oil and gas exploration and development activities.

The right of the Secretary to issue future land use authorizations on an oil and gas lease is reserved by provision of section 29 of the Mineral Leasing Act, 30 U.S.C.s 186 (1982).

All Forest Land Plan and Management Act (FLPMA) authorizations are subject to valid existing rights {Section 701 (b), FLPMA}.

Land uses are authorized in accordance to the law which applies to that specific use at the time of issuance.

Authorities: 10/24/76 FLPMA, Mineral Leasing Act of 1920, as amended, Mining Law of 1872 (as amended), and Acquired Mineral Leasing Act of August 7, 1947.

STIPULATIONS - GENERAL

The following section outlines and lists the stipulations that will apply, by alternative, with a short explanation of the reasons for the stipulation and criteria that would apply for associated waivers, exceptions, and modifications (WEM). Definitions of stipulations are found in the Glossary.

Stipulations for all applicable alternatives follow the "Uniform Format for Oil and Gas Lease Stipulations:, (USDI and USDA, 1989b). Changes in the stipulation on a lease parcel are made by application of WEMs. A WEM is a statement of an exemption from conditions of the stipulation. It allows the oil and gas operation to proceed while still protecting or mitigating the resource. Approval of a WEM is obtained only after appropriate NEPA analysis.

Waivers are a permanent exemption from a lease stipulation. This occurs when the resource no longer requires the protection of stipulation. For example, a waiver would be granted to all lands stipulated for a threatened and endangered species if it were declared recovered and had been removed from the list of protected species.

Exceptions are granted on a case-by-case basis. Each time the lessee applies for an exception, the resource objective of the stipulation must be met. An example of an exception is the granting of access into core winter range before the end of the period specified by the timing stipulation. This might occur, for instance, on core winter range when the winter has been open and the associated wildlife have moved away from their core winter range. An exception decision is granted only for the year in question. In the following year, an exception would have to be evaluated on current seasonal conditions.

Modifications are fundamental changes to the provisions of a lease stipulation either temporarily or for the term of the lease. A specific example of a modification to a stipulation would be if the boundaries of the stipulated area are determined that portions of the area no longer contain core winter range for associated wildlife. The dates for timing restrictions could be modified if new wildlife use information indicated that the timing period is not valid for the leasehold.

The granting of a modification or waiver may involve an issue of major concern. This determination is made by the Authorized Officer. When the operator requests such action, usually at the Application for Permit to Drill (APD) stage, it will be subject NEPA analysis and to a public review period. Under the Uniform Format for Oil and Gas Lease Stipulations each lease stipulation will contain the statement "Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)"

Changes in the data inventory occur as a result of field work by the resource specialists. New use areas and resource locations can be identified during this process. In the same way use areas and resource locations which are no longer valid can be identified. These resources usually cover small areas, requiring the same protection or mitigation as identified resources in this analysis. Identification of new areas or removal of old areas which no longer have those resource values will result in the use of the same lease stipulations as in this analysis and resulting decision. These areas will be added to the existing data inventory without amendment to this analysis. In cases where the changes constitute a change in resource allocation or cover an extensive geographic area, a Forest Plan amendment may be required based upon the impacts to other resources.

Stipulations were developed for all Federal oil and gas lands, regardless of surface ownership. In the case of private surface ownership (split estate lands), the landowner's input is actively solicited by the Forest Service at the actual operations approval or APD stage (Onshore Order No. 1). The private surface owner's wishes are addressed at this stage. Lease stipulations on private surface are not intended to dictate surface management, but are intended to provide required protection of important resources that may be impacted by Federal actions.

STIPULATIONS COMMON AMONG ALL ALTERNATIVES

STIPULATION FOR FOREST PLAN COMPLIANCE: The National Forest Management Act of 1976 requires all National Forests to be managed in accordance with their respective Land and Resource Management Plans (Forest Plan). All leases, permits, and licenses for the use and occupancy of National Forest System lands are required to be consistent with completed Plans. The management standards and guidelines which apply to this leaseholding are contained with Chapters 2 and 3 of the Custer Forest Plan. The accompanying Forest Plan Record of Decision (ROD) document contains some changes and additions to standards contained in Chapters 2 and 3. All of the documents listed above are available for review at the Forest Service office listed at the end of this stipulation.

Standards and guidelines within the Forest Plan establish the framework for the design and implementation of any surface disturbing project. Mitigating measures required for a project will be identified through a site-specific environmental analysis and decision which complies with the National Environmental Policy Act.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Custer National Forest
2102 1st Avenue North
P.O. Box 2556
Billings, MT 59103

Telephone (406) 657-6361

The Forest Supervisor is the authorized representative of the Secretary of Agriculture.

Signature of Lessee

STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF DEPARTMENT OF AGRICULTURE: The lessee/operator must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an operation plan by the Secretary of the Interior, (2) uses of all existing improvements, such as Forest development roads, within and outside the area licensed, permitted or leased by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by an operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Custer National Forest
2102 1st Avenue North
P.O. Box 2556
Billings, MT 59103

Telephone (406) 657-6361

The Forest Supervisor is the authorized representative of the Secretary of Agriculture.

Signature of Lessee

STIPULATIONS - BY RESOURCE

Stipulations are presented in the order of resource issues described in Chapter 2 and followed in Chapter 3 and 4. For each resource issue group a table summarizing the applicable stipulations by Management Area and Alternative are given followed by the description of the appropriate stipulation.

TABLE E-S1

Summary of Stipulation for Soils

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
High hazard and fragile soils	B-All	NSO	NSO	NSO	NSO	ST
	C-Picket Pin	NSO	NSO	NSO	NSO	ST
	C-Stillwater	NSO	NSO	NSO	NL	ST
	C-Palisades	NSO	NSO	NSO	NSO	ST
	C-Line Creek	NSO	NSO	NSO	NSO	ST
	C-Cooke City	NSO	NSO	NS	NL	ST
	D-Picket Pin	NSO	NSO	NSO	NSO	ST
	D-Fishtail	NSO	NSO	NSO	NSO	ST
	D-Butcher Creek	NSO	NSO	NSO	NSO	ST
	D-Palisades	NSO	NSO	NSO	NSO	ST
	D-Line Creek	NL	NSO	NSO	NA	ST
	E-Stillwater	NSO	NSO	NSO	NSO	ST
	F-All*	NSO	NSO	ST	NA	ST
	G-All	NSO	NSO	NSO	NSO	ST
	P-Meyers Creek	NSO	NSO	ST	ST	ST
	R-W. Fk. Rock Cr.	NL	NSO	NSO	NA	ST
	T-Scenic Byway	NL	NSO	NSO	NA/NSO	ST
	T-Glacier Lake	NL	NSO	NSO	NSO	ST

* Not known to occur in MA F-Cascade, and F-Palisades.

NO SURFACE OCCUPANCY

RESOURCE: High hazard and fragile soils.
STIPULATION: Surface occupancy is prohibited within the boundary of high hazard and fragile soils areas.
OBJECTIVE: To maintain soil productivity, provide necessary protection to prevent reclamation problems (especially alpine environments), avoid slopes over 40%, and areas subject to high wind and water erosion, and high hazard or mass failure. Areas identified require NSO to avoid loss of vegetation or movement of soil either through steep slopes, mass failure, or surface erosion which may enter adjacent streams and degrade fisheries or other water uses. Alpine vegetation areas, once disturbed may require decades to revegetate, if ever.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold includes high hazard or fragile soils.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that unreasonably long reclamation, mass erosion, surface erosion into streams, slope failure, and/or slumping can be avoided or otherwise successfully mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include high hazard or fragile soils.

TABLE E-S2

Summary of Stipulation for Sensitive Plant Sites

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Sensitive plant sites	D-Line Cr.	NSO	NSO	LN*	NA	LN*
	F-E. Rosebud	NSO	NSO	LN*	NA	LN*
	T-Scenic Byway	NSO	NSO	LN*	NA	LN*

*See Table E-LN2 for the lease notice.

NO SURFACE OCCUPANCY

RESOURCE: Sensitive plant species and species of special concern.
STIPULATION: Surface occupancy is prohibited within the site boundary of known sensitive plant species and species of special concern.
OBJECTIVE: To prevent species from being listed as threatened or endangered under the Endangered Species Act (ESA). Disturbance of known sites that would reduce numbers of plants or their occupied habitat and the ability to maintain or expand populations could result in listing.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold includes sensitive plant species locations or potential locations.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that sensitive plant species locations or potential locations can be avoided or otherwise successfully mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include sensitive plant species locations or potential locations.

TABLE E-S3

Summary of Stipulation for Grizzly Bear

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Grizzly MS 1	C-Cooke City	NL	NSO	NSO	NL	TL 6/1 thru 11/1
Grizzly MS 2	C-Cooke City	NSO	TL 6/1 thru 11/1	TL 6/1 thru 11/1	NL	LN*
	E-Stillwater	NSO	TL 6/1 thru 11/1	TL 6/1 thru 11/1	TL 6/1 thru 11/1	ST

* See also Table E-LN3 for lease notice

NO SURFACE OCCUPANCY

RESOURCE: Grizzly Bear Management Situation 1 (MS 1) habitat.
STIPULATION: Surface occupancy is prohibited within the boundary of mapped grizzly bear MS 1 habitat.
OBJECTIVE: To protect the MS I habitat of the grizzly bear, an endangered species under the Endangered Species Act (ESA). Operations within occupied grizzly bear habitat are determined to be adverse to the species and may be detrimental to their recovery and ability to fully utilize preferred habitat.
WAIVER: This stipulation may be waived by the authorized officer if it is determined, in consultation with the U.S. Fish and Wildlife Service (USFWS), that the entire leasehold no longer contains habitat critical to the grizzly bear, or if the grizzly bear is declared recovered and is no longer protected under the ESA.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the grizzly bear or its habitat.

If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service in consultation with the USFWS.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined, in consultation with the USFWS, that portions of the area no longer are critical to the grizzly bear.

NO SURFACE OCCUPANCY

RESOURCE: Grizzly Bear Management Situation 2 (MS 2) habitat.
STIPULATION: Surface occupancy is prohibited within the boundary of mapped grizzly bear MS 2 habitat.
OBJECTIVE: To protect the MS 2 habitat of the grizzly bear, an endangered species under the Endangered Species Act (ESA).
WAIVER: This stipulation may be waived by the authorized officer if it is determined, in consultation with the U.S. Fish and Wildlife Service (USFWS), that the entire leasehold no longer contains habitat critical to the grizzly bear, or if the grizzly bear is declared recovered and is no longer protected under the ESA.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the grizzly bear or its habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service in consultation with the USFWS.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined, in consultation with the USFWS, that portions of the area no longer are critical to the grizzly bear.

TIMING

RESOURCE: Grizzly Bear Management Situations 1 and 2 (MS 1 and MS 2) habitat.
STIPULATION: Surface use is prohibited June 1 through November 1 within the boundary of mapped grizzly bear MS 1 and 2 habitat.
OBJECTIVE: To protect the MS 1 and MS 2 habitat of the grizzly bear, an endangered species under the Endangered Species Act (ESA). Operations within the occupied or potentially occupied habitat during the bears active months may be detrimental to the recovery of the species and prevent full occupancy of the preferred and potential habitats.
WAIVER: This stipulation may be waived by the authorized officer if it is determined, in consultation with the U.S. Fish and Wildlife Service (USFWS), that the entire leasehold no longer contains habitat critical to the grizzly bear, or if the grizzly bear is declared recovered and is no longer protected under the ESA.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the grizzly bear or its habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service in consultation with the USFWS.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined, in consultation with the USFWS, that portions of the area no longer are critical to the grizzly bear. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S4

Summary of Golden Eagle Nest Sites

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Nest site	B-Little Rocky	NSO 1 mi.	NSO 0.5 mi.	NSO 0.25 mi., TL 0.5 mi. 2/15 thru 7/20	NSO 0.25 mi., TL O.5 mi. 2/15 thru 7/20	NSO 0.25 mi.
	C-Line Cr.	NSO 1 mi.	NSO 0.5 mi.	NSO 0.25 mi., TL 0.5 mi. 2/15 thru 7/20	NSO 0.25 mi., TL 0.5 mi. 2/15 thru 7/20	NSO 0.25 mi.
	E-Stillwater	NSO 1 mi.	NSO 0.5 mi.	NSO 0.25 mi., TL 0.5 mi. 2/15 thru 7/20	NSO 0.25 mi., TL O.5 mi. 2/15 thru 7/20	NSO 0.25 mi.

Note-no differentiation is made between bald or golden eagles. The decision area contains habitat for golden eagles, however, bald eagles may be in the area during part of the year. Golden eagles are generally afforded the same protection as bald eagles under the Eagle Protection Act.

NO SURFACE OCCUPANCY--Alternative 2

RESOURCE: Golden Eagles
STIPULATION: Surface occupancy is prohibited within 1.0 mile of identified eagle nests.
OBJECTIVE: To protect habitat of golden eagles under the Eagle Protection Act. Operations within one mile of an active nest or potentially active nest would affect the viability of the species and reduce available critical habitat.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the golden eagle.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the eagle or their habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the golden eagle.

NO SURFACE OCCUPANCY--Alternative 3

RESOURCE: Golden Eagles
STIPULATION: Surface occupancy is prohibited within 0.5 mile of identified golden eagle nests.
OBJECTIVE: To protect habitat of golden eagles.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the golden eagle.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the golden eagle or their habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service.

MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the golden eagle.

NO SURFACE OCCUPANCY--Alternatives 4, 4A and 5

RESOURCE: Golden Eagles
STIPULATION: Surface use is prohibited within 0.25 mile of golden eagle **active** and **inactive** nesting areas. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect nesting areas of species under the Eagle Protection Act. Operations within 0.25 miles of a nest are detrimental to the viability and survival of the species. During the active breeding and rearing periods exploration activities may lead to nest abandonment and mortality of young. Activity around apparently inactive nests may prevent reestablishment of the habitat as an active nest site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the golden eagle.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the golden eagle or its nesting habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the golden eagle.

TIMING

RESOURCE: Golden Eagles
STIPULATION: Surface use is prohibited from February 15 through July 20, within 1/2 mile of golden eagle **active** nesting areas and from February 15 through May 1 within 1/2 mile of eagle **inactive** nesting areas. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect nesting areas of golden eagles under the Eagle Protection Act. Restriction of exploration activities during the active period when mating and rearing of young occurs would ensure survival of young and recovery of the species. For inactive nests it would allow birds to reestablish previously preferred sites.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the golden eagle.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the golden eagle or its nesting habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service. **MODIFICATION:** The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the golden eagle. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S5
Summary of Stipulation for Prairie Falcon
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Prairie falcon nest site	C-Palisades	NSO 0.5 mi.	NSO 0.5 mi.	NSO 0.25 mi.	NSO O.25 mi.	NSO 0.25 mi.

NO SURFACE OCCUPANCY--Alternative 2 and 3

RESOURCE: Prairie falcons.
STIPULATION: Surface occupancy is prohibited within 0.5 mile of identified prairie falcon nests.
OBJECTIVE: To protect critical habitat of prairie falcons. To prevent operations within the critical nesting site area that may cause them to abandon a nest site and thereby reduce populations and habitat. To reduce stress caused by noise and activity not screened from the nest site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the prairie falcon.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the prairie falcons or their habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the prairie falcon.

NO SURFACE OCCUPANCY--Alternative 4, 4A and 5

RESOURCE: Prairie falcons.
STIPULATION: Surface occupancy is prohibited within 0.25 mile of identified prairie falcon nests.
OBJECTIVE: To protect critical habitat of prairie falcons. To prevent operations within the critical nesting site that may cause nest abandonment and loss of population and habitat. To reduce stress on birds from noise and activity not screened from the nest site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the prairie falcon.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the prairie falcons or their habitat. If the authorized officer determines that the action may or will have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by the Forest Service.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the prairie falcon.

TABLE E-S6

Summary of Stipulation for Elk

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Meyers Cr. core winter/spring	B-Bad Canyon	TL 11/30 thru 7/1	TL 11/30 thru 7/1	TL 11/30 thru 7/1	TL 11/30 thru 7/1	ST
Trout Cr. core winter/spring	B-Bad Canyon	TL 11/30 thru 6/15	TL 11/30 thru 6/15	TL 11/30 thru 6/15	TL 11/30 thru 7/1	ST
Trout Cr. core summer/fall	B-Bad Canyon	TL 6/1 thru 11/1	TL 6/1 thru 11/1	ST	TL 6/1 thru 11/1	ST
Black Butte summer/fall	B-Little Rocky	TL 6/1 thru 11/1	TL 6/1 thru 11/1	TL 6/1 thru 11/1	ST	
Black Butte winter/spring	B-Black Butte	NSO	TL 11/30 thru 7/1	ST	TL 11/30thru 7/1	ST

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Luther summer/fall	B-Butcher Cr.	NSO	TL 6/1 thru 11/1	ST	TL 6/1 thru 11/1	ST
Meyers Cr. core winter/spring	C-Meyers Cr.	NSO	NSO	NSO	NSO	TL 11/30 thru 7/1
Picket Pin core winter/spring	C-Picket Pin	NSO	NSO	NSO	NSO	TL 11/30 thru 7/1
Line Cr. core winter/spring	C-Line Cr.	NSO	NSO	NSO	TL 11/30 thru 7/1*	TL 11/30 thru 7/1*
Line Cr. core summer/fall	C-Line Cr.	NSO	NSO	NSO	TL 6/1 thru 11/1	TL 6/1 thru 11/1
Meyers Cr. core winter/spring	D-Picket Pin	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	TL 11/30 thru 7/1	ST
Picket Pin core winter/spring	D-Picket Pin	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	TL 11/30 thru 7/1	ST
Black Butte summer/fall	D-Fishtail	NSO	TL 6/1 thru 11/1	ST	TL 6/1 thru 11/1	ST
Luther summer/fall	D-Butcher Cr.	NSO	TL 6/1 thru 11/1	ST	TL 6/1 thru 11/1	ST
Line Cr. core summer/fall	D-Line Cr.	NSO	TL 6/1 thru 11/1	ST	NA	ST
Line Cr. core winter/spring	D-Line Cr.	NSO	NSO	TL 11/30 thru 7/1	NA	ST
Picket Pin and Meyers Cr. core summer/fall	E-Stillwater	NSO	TL 6/1 thru 11/1	ST	NSO	ST
Black Butte summer/fall	G-Fishtail	NSO	TL 6/1 thru 11/1	ST	TL 6/1 thru 11/1	ST
Meyers Cr. core winter/spring	P-Meyers Cr.	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	TL 11/30 thru 7/1	ST
Hellroaring Silver Run core winter/spring	R-W. Fk. Rock Cr.	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	NA	ST
Hellroaring Silver Run core summer/fall	R-W. Fk. rock Cr.	NSO	TL 6/1 thru 11/1	ST	NA	ST
Line Cr. core winter/spring	T-Scenic Byway	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	NA	ST
Line Cr. core summer/fall	T-Scenic Byway	NSO	TL 6/1 thru 11/1	ST	NA	ST
Hellroaring Silver Run core winter/spring	T-Scenic Byway	NSO	TL 11/30 thru 7/1	TL 11/30 thru 7/1	NA	ST
Hellroaring Silver run core summer/fall	T-Scenic Byway	NSO	TL 6/1 thru 11/1	ST	NA	ST

*Where the summer/fall and winter/spring TL ranges overlap a NSO situation is created.

NO SURFACE OCCUPANCY

RESOURCE: Elk summer range.
STIPULATION: Surface occupancy is prohibited in the identified and mapped elk summer/fall range.
OBJECTIVE: To protect elk herds on important summer/fall range and to facilitate long-term maintenance of the population. To prevent stress to elk herds from oil and gas activity that may cause elk to move off traditional use areas, overuse some areas, or move to adjacent herd ranges.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains summer/fall habitat critical to the elk herds.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer contain summer/fall range of the elk herds.

NO SURFACE OCCUPANCY

RESOURCE: Elk winter/spring range.
STIPULATION: Surface occupancy is prohibited in identified and mapped elk winter range.
OBJECTIVE: To protect elk herds on critical winter/spring range and to facilitate long-term maintenance of the population. Disturbance in these ranges would stress elk during critical periods of limited forage, high metabolism requirements, and those times that cows are carrying developing young.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains core winter/spring habitat critical to the identified and mapped elk herd.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer contain critical elk winter/spring range.

TIMING

RESOURCE: Elk summer/fall ranges.
STIPULATION: Surface use is prohibited from June 1 through November 1 for critical elk summer/fall ranges. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect elk herds from disturbance during the core summer/fall use season and to facilitate long-term maintenance of the population. To prevent stress from oil and gas related activities to resident herds that may cause them to leave traditional ranges, overuse some areas, or move to ranges occupied by other herds.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the herd summer/fall needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the elk herds. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TIMING

RESOURCE: Critical elk winter/spring ranges.
STIPULATION: Surface use is prohibited from November 30 through July 1 for identified and mapped critical elk winter/spring ranges. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect the elk herds during the winter/spring season of use and facilitate long-term maintenance of the population. To prevent stress to elk during periods when forage is at a minimum,

metabolism rates are high, and cows are carrying developing young. To prevent stress to cows and newborn calves on calving areas.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the elk herd winter/spring needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the identified and mapped elk herds. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S7
Summary of Stipulation for Bighorn Sheep
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Stillwater sheep winter	C-Stillwater	NL	NSO	NSO	NL	TL 11/1 thru 6/1
Rock Cr. winter	C-Line Cr.	NSO	NSO	NSO	TL 11/1 thru 7/1*	ST
W. Rosebud winter	D-Fishtail	NSO	TL 11/1 thru 5/1**	TL 11/1 thru 5/1**	TL 11/1 thru 5/1**	ST
Rock Cr. winter	D-Line Cr.	NSO	NSO	TL 11/1 thru 7/1*	NA	ST
Stillwater winter	E-Stillwater	NSO	TL 11/1 thru 6/1	TL 11/1 thru 6/1	TL 11/1 thru 6/1	ST
Stillwater winter	F-Woodbine	NSO	TL 11/1 thru 6/1	TL 11/1 thru 6/1	NA	ST
W. Rosebud winter	G-Fishtail	NSO	TL 11/1 thru 6/1	TL 11/1 thru 6/1	TL 11/1 thru 6/1	ST
Rock Cr. winter	T-Scenic Byway	NSO	TL 11/1 thru 7/1*	TL 11/1 thru 7/1*	NA	ST

* Lambing occurs on the winter range, Forest Plan, Pg 172
** This herd winters in the Wilderness but moves to lower elevations in the spring. Recent information indicates that lambing occurs in the Wilderness. Forest Plan, Pg. 172

NO SURFACE OCCUPANCY

RESOURCE: Bighorn sheep winter range.
STIPULATION: Surface occupancy is prohibited in identified and mapped bighorn sheep core winter range.
OBJECTIVE: To protect bighorn sheep herds on core winter range and to facilitate long-term maintenance of the population. Disturbance within these ranges for bighorn sheep produces stress during times of critical need for forage, high metabolism rates, and periods when ewes are carrying developing lambs as well as during the spring lambing period when ewes and lambs are vulnerable to predation.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains core winter habitat critical to the identified and mapped herds.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts to the bighorn sheep herds from the proposed action are acceptable or can be adequately mitigated.

MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer contain core winter range of the identified and mapped herd.

TIMING

RESOURCE: Rock Creek and W. Rosebud bighorn sheep winter range.
STIPULATION: Surface use is prohibited from November 1 through July 1 for the Rock Creek and W. Rosebud Bighorn Sheep winter range. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect Rock Creek and West Rosebud Bighorn Sheep herds from disturbance during the winter use season, and to facilitate long-term maintenance of the populations. Disturbance within these ranges for bighorn sheep produces stress during times of critical need for forage, high metabolism rates, and periods when ewes are carrying developing lambs.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the Rock Creek and West Rosebud Bighorn Sheep winter needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the Rock Creek and West Rosebud Bighorn Sheep herds. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TIMING

RESOURCE: Stillwater and W. Rosebud bighorn sheep winter range.
STIPULATION: Surface use is prohibited from November 1 through June 1 for the Stillwater Bighorn Sheep winter range (MA C) and from November 1 through May 1 for the W. Rosebud Bighorn Sheep winter range (MA D). This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect bighorn sheep herds from disturbance during the winter use season, and to facilitate long-term maintenance of the populations. Disturbance within these ranges for bighorn sheep produces stress during times of critical need for forage, high metabolism rates, and periods when ewes are carrying developing lambs.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the Stillwater and West Rosebud Bighorn Sheep winter needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the Stillwater and West Rosebud Bighorn Sheep herds. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S8
Summary of Stipulation for Mule Deer
By Mnangement Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Sheep Cr. winter	B-Bad canyon	TL 12/1 thru 4/15	TL 12/1 thru 4/15	ST	ST	ST

TIMING

RESOURCE: Sheep Creek deer winter range.
STIPULATION: Surface use is prohibited from December 1 through April 15 for the Sheep Creek deer winter range. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect the Sheep Creek deer herd from disturbance during the winter use season, and to facilitate long-term maintenance of the population. Disturbance within these ranges for mule deer produces stress during times of critical need for forage, high metabolism rates, and periods when does are carrying developing fawns.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the Sheep Creek deer herd winter needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the Sheep Creek deer herd. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S9
Summary of Stipulation for Moose
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
McDonald Basin summer/fall	B-Little Rocky	NSO	TL 6/16 thru 10/14	ST	ST	ST
McDonald Basin winter/spring	B-Little Rocky	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15 ST	
E. Rosebud winter/ spring	B-Black Butte	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
McDonald Basin winter/spring	B-Black Butte	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
Red Lodge Creek winter/spring	B-Butcher Cr.	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
Palisades winter/ spring	C-Palisades	NSO	NSO	NSO	NSO	TL 10/15 thru 6/15
Lodgepole winter/ spring	D-Picket Pin	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
McDonald Basin winter/spring	D-Fishtail	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
Palisades winter/ spring	D-Palisades	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
W. Stillwater winter/ spring	E-Stillwater	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
McDonald Basin summer/fall	E-Stillwater	NSO	TL 6/16 thru 10/14	ST	ST	ST

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
McDonald Basin summer/fall and winter/spring	F-W. Rosebud	NSO	TL 10/15 thru 6/15	ST	ST	NA
E. Rosebud winter/spring	F-E. Rosebud	NSO	TL 10/15 thru 6/15	ST	ST	NA
McDonald Basin winter/spring	G-Fishtail	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST
Red Lodge Cr. winter/spring	G-Red Lodge	NSO	TL 10/15 thru 6/15	ST	TL 10/15 thru 6/15	ST

NO SURFACE OCCUPANCY

RESOURCE: Moose core winter/spring and summer/fall range.
STIPULATION: Surface occupancy is prohibited in the moose core winter/spring and summer/fall range.
OBJECTIVE: To protect moose herds on critical winter/spring and summer/fall range and to facilitate long-term maintenance of the population. Disturbance to the herds in winter causes stress during a time when forage needs are high to sustain metabolism and cows are developing young. Calving occurs on the winter/spring ranges and disturbance may cause increase in mortality. Summer ranges are limited and animals may be displaced by disturbance to less desired habitat with lower nutritional value and increased vulnerability to mortality.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains core winter/spring and summer/fall habitat critical to the identified and mapped herds.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer contain core winter/spring and/or summer/fall range of the identified and mapped moose herd.

TIMING

RESOURCE: Moose winter/spring range.
STIPULATION: Surface use is prohibited from October 15 through June 15 for moose winter/spring ranges. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect identified and mapped critical moose winter/spring range from disturbance and to facilitate long-term maintenance of the population. Disturbance to the herds in winter causes stress during a time when forage needs are high to sustain metabolism and cows are developing young. Calving also occurs on these ranges and disturbance may cause increased mortality.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the moose herds' winter/spring needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the identified and mapped moose herd. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TIMING

RESOURCE: Moose summer/fall range.
STIPULATION: Surface use is prohibited from June 16 through October 14 for moose summer/fall range. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect moose herds from disturbance during the summer/fall use season, and to facilitate long-term maintenance of the population. Disturbance during the summer/fall causes stress upon the species. Summer ranges are limited and animals may be displaced by disturbance to less desired habitat with lower nutritional value and increased vulnerability to mortality.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the moose herd's summer/fall needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the moose herd. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S10

Summary of Stipulation for Mountain Goat

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
E. Rosebud winter	B-Black Butte	NSO	TL 11/1 thru 7/1	ST	ST	ST
Line Cr. summer and winter	C-Line Cr.	NSO	NSO	ST	ST	ST
Line Cr. summer and winter	D-Line Cr.	NSO	NSO	ST	NA	ST

NO SURFACE OCCUPANCY

RESOURCE: Line Creek mountain goat winter and summer range.
STIPULATION: Surface use is prohibited for the Line Creek mountain goat winter and summer range. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect the Line Creek mountain goat herd from disturbance during the winter and summer use season, and to facilitate long-term maintenance of the population. To prevent disturbance within the identified and mapped ranges of the mountain goat that would result in displacement to other areas not as desired, concentrate the herd and result in overuse of portions of the range, increase stress during periods of high nutritional needs, cause stress on females carrying young or to females with kids on birthing areas.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the Line Creek mountain goat winter and summer needs.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the Line Creek mountain goat herd. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TIMING

RESOURCE: East Rosebud mountain goat winter range.
STIPULATION: Surface use is prohibited from November 1 through July 1 for the East Rosebud mountain goat winter range. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect the East Rosebud mountain goat herd from disturbance during the winter use season, and to facilitate long-term maintenance of the populations. Disturbance within these ranges for mountain goat produces stress during times of critical need for forage, high metabolism rates, and periods when females are carrying developing kids.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains winter range critical to the East Rosebud mountain goats.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical mountain goat winter range. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold.

TABLE E-S11
Summary of Stipulation for Yellowstone Cutthrout Trout
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Yellowstone Cutthroat trout (verified)	B-Bad Canyon	NSO 300'	NSO 300'	NSO 300'	NSO 300'	ST

See also Table E-LN4 for lease notices.

NO SURFACE OCCUPANCY

RESOURCE: Yellowstone cutthroat trout (verified genetically pure).
STIPULATION: Surface occupancy is prohibited within 300 feet (0.06 mile) of verified genetically pure strain Yellowstone cutthroat trout populations and associated stream reaches.
OBJECTIVE: To protect Yellowstone cutthroat trout, a Forest Service Region 1 and state of Montana sensitive species. Any degradation of the habitat through sedimentation or pollution could result in population loss and possible listing as threatened and endangered under the Endangered Species Act (ESA).
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains Yellowstone cutthroat trout populations.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are within 300 feet (0.06 mile) of genetically verified pure strain populations of Yellowstone cutthroat trout.

TABLE E-S12

Summary of Stipulation for Management Area C

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Management area C wildlife	C-Meyers Creek elk winter/spring	NSO	NSO	NSO	NSO	ST
	C-Picket Pin elk winter/spring	NSO	NSO	NSO	NSO	ST
	C-Stillwater bighorn sheep winter	NSO	NSO	NSO	NL	ST
	C-Palisades moose winter	NSO	NSO	NSO	NSO	ST
	C-Line Creek elk year-around habitat	NSO	NSO	NSO	TL, NSO TL overlap	ST
	C-Cooke City	NSO	NSO	NSO	NL	ST

NO SURFACE OCCUPANCY

RESOURCE: Forest Plan Management Area C.
STIPULATION: Surface occupancy is prohibited in Forest Plan Management Area C.
OBJECTIVE: To protect critical wildlife habitat as identified in the Forest Plan and facilitate long-term maintenance of wildlife populations. These areas are recognized for their critical wildlife habitat and other resource use will be modified to maintain or improve existing wildlife habitat.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains habitat critical to the species associated with Management Area C.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that the proposed action will not affect the species associated with Management Area C.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area no longer are critical to the species associated with Management Area C.

TIMING

ELK - Timing stipulations for elk are found after Table E-S6.

TABLE E-S13

Summary of Stipulation for Riparian

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Riparian areas	B-All	NSO	NSO	NSO	NSO	ST
	C-Picket Pin	NSO	NSO	NSO	NSO	NSO
	C-Stillwater	NSO	NSO	NSO	NL	NSO
	C-Palisades	NSO	NSO	NSO	NSO	NSO
	C-Line Creek	NSO	NSO	NSO	NSO	NSO
	C-Cooke City	NSO	NSO	NSO	NL	NSO
	D-Picket Pin	NSO	NSO	NSO	NSO	NSO
	D-Fishtail	NSO	NSO	NSO	NSO	NSO
	D-Butcher Creek	NSO	NSO	NSO	NSO	NSO
	D-Palisades	NSO	NSO	NSO	NSO	NSO
	D-Line Creek	NSO	NSO	NSO	NA	NSO
	E-Stillwater	NSO	NSO	NSO	NSO	ST
	F-All	NSO	NSO	NSO	NA	NSO
	G-All	NSO	NSO	NSO	NSO	ST
	P-All	NSO	NSO	NSO	NSO	NSO
	R	NSO	NSO	NSO	NA	NSO
	T-Scenic Byway	NSO	NSO	NSO	NA/NSO*	NSO
	T-Glacier Lake	NSO	NSO	NSO	NSO	NSO

*Most of the area is NA. A portion north and west is **AVAILABLE** with NSO and TL/CSU stipulations.

NO SURFACE OCCUPANCY

RESOURCE: Forest Plan Management Area M--riparian areas.
STIPULATION: Surface occupancy is prohibited in Forest Plan MA M which consists of all riparian areas and on water bodies and streams.
OBJECTIVE: To protect the unique biological and hydrological features associated with riparian areas, and water bodies and streams. To prevent deterioration of these critical areas and loss of total acreage of riparian habitat that is recognized as one of the most used and diverse habitats in the area.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold does not include riparian areas, water bodies, or streams.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include riparian areas, water bodies, or streams.

TABLE E-S14

Summary of Stipulation for Red Lodge Water Supply Area

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
RED LODGE WATER SUPPLY AREA	R-W. Fk. Rock Cr.	NL	NSO All	NSO >30%, CSU <30%	NA	CSU All

NO SURFACE OCCUPANCY--Alternative 3

RESOURCE: Forest Plan Management Area R - Red Lodge Water Supply Area
STIPULATION: Surface occupancy is prohibited in Forest Plan Management Area - water supply area for the town of Red Lodge.
OBJECTIVE: To protect the water source for the town of Red Lodge. To prevent any activity that may increase sedimentation or introduce pollutants into the water source for the town of Red Lodge.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer includes portions of the water source for the town of Red Lodge.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the Red Lodge water source boundaries have changed.

NO SURFACE OCCUPANCY--Alternative 4

RESOURCE: Forest Plan Management Area R--Red Lodge Water Supply Area.
STIPULATION: Surface occupancy is prohibited **ON SLOPES OVER 30%** in Forest Plan Management Area R - Red Lodge Water Supply Area.
OBJECTIVE: To protect the water source for the town of Red Lodge.
To prevent any activity **ON SLOPES OVER 30%** that may increase sedimentation or introduce pollutants into the water source for the town of Red Lodge.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of the Red Lodge water supply area.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the Red Lodge water source boundaries have changed.

CONTROLLED SURFACE USE--Alternative 4

RESOURCE: Forest Plan Management Area R--Red Lodge Water Supply Area.
STIPULATION: All surface-disturbing activities **ON SLOPES UNDER 30%**, semi-permanent and permanent facilities within Management Area R, water source for the town of Red Lodge, may require special design such as, but not limited to full bench construction, end-haul construction, sidecasting restrictions, and/or reduced clearing limits.
OBJECTIVE: To protect the water source for the town of Red Lodge.
To prevent any activity **ON SLOPES UNDER 30%** that may increase sedimentation or introduce pollutants into the water source for the town of Red Lodge.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains the Red Lodge water source.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the Red Lodge water source boundaries have changed.

CONTROLLED SURFACE USE--Alternative 5

RESOURCE: Forest Plan Management Area R--Red Lodge Water Supply Area.
STIPULATION: All surface-disturbing activities, semi-permanent and permanent facilities within Management Area R, water source for the town of Red Lodge, may require special design such as, but not limited to full bench construction, end-haul construction, sidecasting restrictions, and/or reduced clearing limits. **OBJEC-**

TIVE: To protect the water source for the town of Red Lodge. To prevent any activity on the MA that may increase sedimentation or introduce pollutants into the water source for the town of Red Lodge.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains the Red Lodge water source.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that the Red Lodge water source boundaries have changed.

TABLE E-S15

Summary of Stipulation for Aesthetics

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Visuals >40% slopes	B-Bad Canyon	NSO	NSO	NSO	NSO	ST
	B-Little Rocky	NSO	NSO	NSO	NSO	ST
	B-Black Butte	NSO	NSO	NSO	NSO	ST
	B-Butcher Cr.	NSO	NSO	NSO	NSO	ST
	C-Palisades	NSO	NSO	NSO	NSO	ST
	C-Line Cr.	NSO	NSO	ST	NSO	ST
	D-Picket Pin	NSO	NSO	NSO	NSO	ST
	D-Fishtail	NSO	NSO	NSO	NSO	ST
	D-Butcher Cr.	NSO	NSO	NSO	NSO	ST
	D-Palisades	NSO	NSO	NSO	NSO	ST
	D-Line Cr.	NL	NSO (ALL)	NSO	NA	ST
	E-Stillwater	NSO	NSO	NSO	NSO	ST
	G-All	NSO	NSO	NSO	NSO	ST
Visuals Retention VQO for MA	T-Scenic Byway	NL	NSO ALL	NSO >40%, CSU remainder	NA, NSO >40%	NSO >40%, CSU remainder
	T-Glacier Lake	NL	NSO ALL	NSO >40%N CSU remainder	NSO >40%, CSU remainder	CSU
Visuals retention or partial retention VQO for MA	F-W. Rosebud	NSO	TL 5/15 thru 9/15	ST	NA	ST
	F-E. Rosebud	NSO	TL 5/15 thru 9/15	ST	NA	ST
	F-Rock Cr.	NL	TL 5/15 thru 9/15	ST	NA	ST
Visual 0.25 mi. buffer around MA to meet retention or partial retention VQO	F-W. Rosebud	CSU	CSU	CSU	NA	ST
	F-E. Rosebud	CSU	CSU	CSU	NA	ST
	F-Rock Cr	CSU	CSU	CSU	NA	ST
Visual ski area	F-Grizzly Peak	NSO	TL 11/15 thru 4/15	ST	NA	ST

NO SURFACE OCCUPANCY

RESOURCE: Visual quality on slopes over 40%.
STIPULATION: Surface occupancy is prohibited on slopes over 40%.
OBJECTIVE: To maintain and protect visual quality in important viewing areas. To prevent large landscape disturbances from road or well pad building on slopes over 40% which are highly visible and difficult or nearly impossible to mitigate.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold includes slopes over 40%.

EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that visible landscape disturbances can be avoided or otherwise successfully mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include slopes over 40%.

NO SURFACE OCCUPANCY--Alternative 3, Management Area D-Line Creek

RESOURCE: Visual quality.
STIPULATION: Surface occupancy is prohibited on MA D-Line Creek.
OBJECTIVE: To maintain and protect visual quality in the critical viewing area of MA D seen from the Beartooth Scenic Highway. Prevent any degradation of the seen area by not allowing any surface disturbing activities.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that none of the leasehold includes areas seen from the Beartooth Highway.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that surface disturbing activities in the seen area can be avoided or otherwise successfully mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area do not include seen areas.

TIMING--Alternative 3

RESOURCE: Management Area F, retention or partial retention VQO.
STIPULATION: Surface use is prohibited May 15 through September 15 within 0.25 mile of developed campgrounds, MA F.
OBJECTIVE: To protect the immediate surroundings of developed recreation areas and reduce potential for impacts on visuals, odors, and sounds to recreationists. Activities closer than 0.25 mile from the boundary of the recreation use area may produce sights, sounds and odors that are not compatible with the management goals.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains developed recreation areas.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the developed recreation boundaries have changed. The dates for the timing restriction may be modified if new recreational use information indicates that the dates are not valid for the leasehold.

TIMING--Alternative 3, MA F-Grizzly Peak

RESOURCE: Red Lodge Mountain Ski Area.
STIPULATION: Surface use is prohibited November 15 through April 30 within 0.25 mile of Red Lodge Mountain Ski Area.
OBJECTIVE: To protect the immediate surroundings of Red Lodge Mountain Ski Area and reduce potential for impacts on visuals, odors, and sounds to recreationists. Activities during the winter recreation period closer than 0.25 mile may produce effects that are not compatible with the management goals.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of the Red Lodge Mountain Ski Area.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the Red Lodge Mountain Ski Area boundaries have changed. The dates for the timing restriction may be modified if new recreational use information indicates that the dates are not valid for the leasehold.

CONTROLLED SURFACE USE

RESOURCE: Retention VQO, Forest Plan Management Area T.
STIPULATION: All surface-disturbing activities, including semi-permanent and permanent oil and gas facilities, **ON SLOPES UNDER 40%** within MA T may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect the esthetic quality as viewed from the Beartooth Scenic Highway and to meet retention standards. Oil and gas related activities visible within the area may need modification to avoid objectionable intrusions on the natural landscape and meet visual quality objectives for the area.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of Management Area T.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that Management Area T boundaries have changed.

CONTROLLED SURFACE USE

RESOURCE: Retention or partial retention, Forest Plan Management Area F.
STIPULATION: All surface-disturbing activities, including semi-permanent and permanent oil and gas facilities, within 0.25 miles of the boundary of MA F may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect the esthetic quality within 0.25 miles of MA F and to meet retention or partial retention standards. Oil and gas related activities visible within the area may need modification to avoid objectionable intrusions on the natural landscape and meet visual quality objectives for the area.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer is within the boundaries of MA F.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that MA F boundaries have changed.

TABLE E-S16
Summary of Stipulation for Recreation
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Developed campground	F-Woodbine	NSO MA	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-W. Rosebud	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-E. Rosebud	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site. TI 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-Cascade	NSO MA	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-Basin	NSO MA	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-Palisades	NSO MA	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
	F-Rock Cr.	NSO MA	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NSO site, TL 0.25 mi. 5/15 thru 9/15, CSU 0.25 mi.	NA	NSO site
Picnic area	R-W. Fk. Rock Cr.	NSO	CSU 0.25 mi.	ST	NA	ST
Trails	B-Bad Canyon	CSU 0.25 mi.	CSU 0.25 mi.	ST	ST	ST
	C-Picket Pin	NSO 0.25 mi.	CSU 0.25 mi.	ST	ST	ST
	C-Line Cr.	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	ST	ST
	C-Cooke City	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NL	ST
	D-Picket Pin	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	ST	ST

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
	D-Palisades	TL 0.25 Mi. 5/15 thru 9/15	CSU 0.25 mi.	ST	ST	ST
	D-Line creek	NSO 0.25 M	TL 0.25 M 5/15 thru 9/15	ST	NA	ST
	E-Stillwater	CSU 0.25 mi.	CSU 0.25 mi.	ST	ST	ST
	F-Woodbine	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	F-W.Rosebud	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	F-E. Rosebud	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	F-Grizzly Peak	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	F-Rock Cr.	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	G-Fishtail	CSU 0.25 mi.	CSU 0.25 mi.	ST	NA	ST
	R-W. Fk. Rock Cr.	TL 0.25 Mi. 5/15 thru 9/15	CSU 0.25 mi.	ST	NA	ST
	T-Scenic Byway	NSO 0.25 MI.	TL 0.25 MI. 5/15 thru 9/15	ST	NA	ST
	T-Glacier Lake	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	ST	ST

NO SURFACE OCCUPANCY--Alternative 2

RESOURCE: Management Area F--Developed recreation setting.
STIPULATION: Surface occupancy is prohibited in all of MA F as mapped.
OBJECTIVE: To protect developed recreation areas and achieve the management goal for the setting in and around developed sites. Oil and gas related activities would introduce sights, sounds and odors within the MA would be detrimental to the recreation experience.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of MA F developed recreation areas.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the MA F developed recreation boundaries have changed.

NO SURFACE OCCUPANCY--0.25 mile buffer

RESOURCE: Developed campgrounds and trails.
STIPULATION: Surface occupancy is prohibited within 0.25 miles of the boundary of developed campgrounds and trails and trailhead facilities.
OBJECTIVE: To protect developed recreation areas and the surrounding setting. To prevent degradation of the recreation experience from the sight, sound or odors from oil and gas related activities within 0.25 miles of the recreation facility.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains developed recreation areas or facilities.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the developed recreation boundaries have changed.

NO SURFACE OCCUPANCY-Site only

RESOURCE: Developed campgrounds and picnic sites.
STIPULATION: Surface occupancy is prohibited within the boundary of developed campgrounds and picnic sites.
OBJECTIVE: To protect developed recreation sites and reduce potential for impacts on visuals, odors, and sounds to recreationists. To prevent degradation of the recreation experience from the sight, sound or odors from oil and gas related activities within the recreation facility itself.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains developed recreation sites.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the developed recreation boundaries have changed.

TIMING

RESOURCE: Developed campgrounds and trails.
STIPULATION: Surface use is prohibited from May 15 through September 15 within 0.25 mile of the boundary of developed campgrounds and trails and trailheads. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect developed recreation areas and the setting they are in. These areas are known to receive concentrated public use. To prevent degradation of the recreation experience from the sight, sound or odors from oil and gas related activities within the recreation facility itself through limiting activities during the peak season of use.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains developed recreation facilities and associated use.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of it are no longer deemed a developed recreational area. The dates for the timing restriction may be modified if new recreational use information indicates that the dates are not valid for the leasehold.

CONTROLLED SURFACE USE

RESOURCE: Developed campgrounds, trailheads and trails.
STIPULATION: All surface-disturbing activities, including semi-permanent and permanent oil and gas facilities, within 0.25 mile of developed campgrounds, trailheads and trails may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect developed recreation facilities and the setting they are in. These areas are known to receive concentrated public use. To reduce degradation of the recreation experience from the sight, sound or odors from oil and gas related activities within the recreation facility and its setting through modification of planned facilities.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains developed campgrounds, trailheads or trails.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that developed campgrounds, trailheads or trail boundaries have changed.

TABLE E-S17

Summary of Stipulation for Cultural

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Cultural areas	C-Picket Pin	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site, CSU 0.25 mi. buffer
	C-Stillwater	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NL	NSO site, CSU 0.25 mi. buffer
	D-Picket Pin	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site, CSU 0.25 mi. buffer
	E-Stillwater	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site, CSU 0.25 mi. buffer
	P-All	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site, CSU 0.25 mi. buffer
	R-W. Fk Rock Cr.	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NSO site with 0.25 mi. buffer	NA	NSO site, CSU 0.25 mi. buffer

NOTE: Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural properties eligible to the National Register of Historic Places.

NO SURFACE OCCUPANCY-Site only

RESOURCE: Cultural
STIPULATION: Surface occupancy is prohibited within sites or areas designated for conservation use or sociocultural use.

OBJECTIVE: To protect those cultural properties identified for conservation use or sociocultural use. To prevent activities that would affect the site itself or any of the cultural properties on the site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that all designated sites or areas within the leasehold can be occupied without adversely affecting the cultural resource values for which sites or areas were designated, or if all designated site or areas within the leasehold are allocated for other uses.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that cultural resource values which formed the basis for designation are not affected, or if adverse impacts are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the designated site or area can be occupied without adversely affecting the cultural resource values for which the site or area was designated.

NO SURFACE OCCUPANCY-Site and setting

RESOURCE: Cultural
STIPULATION: Surface occupancy is prohibited within sites or areas designated for conservation use or sociocultural use and within a 0.25 mile buffer around the site.
OBJECTIVE: To protect those cultural properties and associated setting identified for conservation use or sociocultural use. To prevent activities that would affect the site itself, cultural properties or the setting that is important to the site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that all designated sites or areas within the leasehold can be occupied without adversely affecting the cultural resource values for which sites or areas were designated, or if all designated site or areas within the leasehold are allocated for other uses.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that cultural resource values which formed the basis for designation are not affected, or if adverse impacts are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the designated site or area can be occupied without adversely affecting the cultural resource values for which the site or area was designated.

CONTROLLED SURFACE USE - Site only

RESOURCE: Cultural
STIPULATION: All surface-disturbing activities, semi-permanent and permanent oil and gas facilities within sites or areas designated for conservation use or sociocultural use may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect the esthetic quality and setting of properties identifiedfor conservation use or sociocultural use. To reduce impacts of activities so their presence does not detract from the cultural and/or ethnographic values.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer is within a known site.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that site area has changed.

CONTROLLED SURFACE USE - Buffer for setting

RESOURCE: Cultural
STIPULATION: All surface-disturbing activities, semi-permanent and permanent oil and gas facilities within 0.25 mile of the boundary of sites or areas designated for conservation use or sociocultural use may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect the esthetic quality and setting as viewed from sites or areas designated as conservation use or sociocultural use.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer is within the viewshed of the designated site or area.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that viewing area of the designated site or area has changed.

NO SURFACE OCCUPANCY-Site only

RESOURCE: Cultural.
STIPULATION: Surface occupancy is prohibited within sites or areas designated for conservation use or sociocultural use.
OBJECTIVE: To protect those cultural properties identified for conservation use or sociocultural use. To prevent activities that would affect the site itself or any of the cultural properties on the site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that all designated sites or areas within the leasehold can be occupied without adversely affecting the cultural resource values for which sites or areas were designated, or if all designated site or areas within the leasehold are allocated for other uses.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that cultural resource values which formed the basis for designation are not affected, or if adverse impacts are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the designated site or area can be occupied without adversely affecting the cultural resource values for which the site or area was designated.

NO SURFACE OCCUPANCY-Buffer for setting

RESOURCE: Cultural.
STIPULATION: Surface occupancy is prohibited within sites or areas designated for conservation use or sociocultural use and within a 0.25 mile buffer around the site.
OBJECTIVE: To protect those cultural properties and associated setting identified for conservation use or sociocultural use. To prevent activities that would affect the site itself, cultural properties or the setting that is important to the site.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that all designated sites or areas within the leasehold can be occupied without adversely affecting the cultural resource values for which sites or areas were designated, or if all designated site or areas within the leasehold are allocated for other uses.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that cultural resource values which formed the basis for designation are not affected, or if adverse impacts are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that portions of the designated site or area can be occupied without adversely affecting the cultural resource values for which the site or area was designated.

CONTROLLED SURFACE USE - Buffer for setting

RESOURCE: Cultural.
STIPULATION: All surface-disturbing activities, semi-permanent and permanent oil and gas facilities within 0.25 mile of the boundary of sites or areas designated for conservation use or sociocultural use may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To protect the esthetic quality and setting as viewed from sites or areas designated as conservation use or sociocultural use.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer is within the viewshed of the designated site or area.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The boundaries affected by this stipulation may be modified by the authorized officer if it is determined that viewing area of the designated site or area has changed.

TABLE E-S18
Summary of Stipulation for Roadless Areas
By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Meyers Cr. 1371	B-Bad Canyon	NSO	ST	ST	ST	ST
Black Butte 1368	B-Black Butte	NSO	NSO	ST	ST	ST
Meyers Cr. 1371	C-Picket Pin	NSO	NSO	ST	ST	ST
W. Woodbine 1369	C-Stillwater	NSO	NSO	ST	NL	ST
Line Cr. 1911	C-Line Cr.	NSO	NSO	ST	ST	ST
Mineral Mtn. 1377, Beartooth 1912	C-Cooke City	NSO	NSO	ST	NL	ST
Meyers Cr. 1371	D-Picket Pin	NSO	NSO	ST	ST	ST
	D-Fishtail	NSO	NSO	ST	ST	ST
Line Cr. Plateau 1911	D-Line Cr.	NL	NSO	ST	NA	ST
Fishtail Saddleback 1366, W. Woodbine 1369	E-Stillwater	NSO	ST	ST	ST	ST
Fishtail Saddleback 1366	F-W. Rosebud	NSO	NSO	ST	NA	ST
Burnt Mtn. 1364	F-Grizzly Peak	NSO	NSO	ST	NA	ST
Burnt Mtn. 1364	F-Cascade	NSO	NSO	ST	NA	ST
Fishtail Saddleback 1366	G-Fishtail	NSO	ST	ST	ST	ST
Burnt Mtn. 1364	G-Red Lodge	NSO	ST	ST	ST	ST
Burnt Mtn. 1364	R-W. Fk. Rock Cr.	NSO	NSO	ST	NA	ST
Red Lodge Hellroaring 1363	T-Scenic Byway	NSO	NSO	ST	NA	ST

NO SURFACE OCCUPANCY

RESOURCE: Roadless areas.
STIPULATION: Surface occupancy is prohibited in identified and mapped roadless areas.
OBJECTIVE: To protect the roadless qualities and attributes found in roadless areas. To prevent activities that would change the roadless character and make an area unsuitable for further consideration.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of roadless areas.

EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that roadless area boundaries have changed.

TABLE E-S19

Summary of Stipulation for Proposed Recreation Rivers

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
E. Rosebud	B-Black Butte	TL 0.25 mi. 5/15 thru 9/15	CSU 0.25 mi.	ST	ST	ST
Stillwater	E-Stillwater	CSU 0.25 mi.	CSU 0.25 mi.	ST	ST	ST
E. Rosebud	F-E. Rosebud	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	NA	ST
W. Fk. Rock Cr.	F-Cascade	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	NA	ST
W. Fk. Rock Cr.	F-Basin	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	NA	ST
Rock Cr.	F-Rock Cr.	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	NA	ST
W. Fk. Rock Cr.	P-Rock Cr.	TL 0.25 mi. 5/15 thru 9/15	CSU 0.25 mi.	ST	ST	ST
W. Fk. Rock Cr.	R-W. Fk. Rock Cr.	TL 0.25 mi. 5/15 thru 9/15	CSU 0.25 mi.	ST	NA	ST
Main Fk. and Lake Fk. of Rock Cr.	T-Scenic Byway	NSO 0.25 mi.	TL 0.25 mi. 5/15 thru 9/15	ST	NA	ST

NO SURFACE OCCUPANCY

RESOURCE: Proposed Recreation Rivers.
STIPULATION: Surface use is prohibited within 0.25 mile of the proposed Recreation Rivers.
OBJECTIVE: To protect the immediate surroundings of the proposed Recreation Rivers and reduce potential for impacts on visuals, odors, and sounds to recreationists. To prevent degradation of the river and the 0.25 mile corridor on each side from occupancy, loss of vegetation or the impacts of sights, sounds and odors that detract from the natural setting.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of these proposed Recreation Rivers.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.

MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the proposed Recreation River boundaries have changed.

TIMING

RESOURCE: Proposed Recreation Rivers.
STIPULATION: Surface use is prohibited from May 15 through September 15 within 0.25 mile of proposed Recreation Rivers.
OBJECTIVE: To protect the immediate surroundings of proposed Recreation Rivers and reduce potential for impacts on visuals, odors, and sounds to recreationists. To prevent degradation of the river and the 0.25 mile corridor on each side from occupancy and the impacts of sights, sounds and odors that detract for the natural setting during the period of peak public use.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of these proposed Recreation Rivers.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the proposed Recreation River boundaries have changed. The dates for the timing restriction may be modified if new recreational use information indicates that the dates are not valid for the leasehold.

CONTROLLED SURFACE USE

RESOURCE: Proposed Recreation Rivers.
STIPULATION: All surface-disturbing activities, including semi-permanent and permanent oil and gas facilities, within 0.25 mile of proposed Recreation Rivers may require special design, including location, painting, and camouflage, to blend with the natural surroundings and meet the visual quality objectives for the area.
OBJECTIVE: To control the visual impacts of activities and facilities within 0.25 miles of proposed Recreation Rivers. Modification of facilities and activities within the area may be needed to reduce the effects of visual, noise and odor upon recreation users and meet visual quality objectives.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of Recreation Rivers.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that proposed Recreation River boundaries have changed.

TABLE E-S20

Summary of Stipulation for Recreation Residences and Camps

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
Recreation residences	E-Stillwater	NSO site	ST	ST	ST	ST
Red Lodge Ski Area	F-Grizzly Peak	NSO site	NSO site	ST	NA	ST
Residences and organization camp	R-W. Fk. Rock Cr.	NSO site	ST	ST	NA	ST
	T-Scenic Byway	NSO site, TL 0.25 mi. 5/15 thru 9/15	NSO site	ST	NA	ST

NO SURFACE OCCUPANCY

RESOURCE: Recreation residences, Red Lodge Ski Area and organization camps.
STIPULATION: Surface occupancy is prohibited within the boundary of recreation residences, Red Lodge Ski Area and organization camp sites under special use permit from the Forest Service.
OBJECTIVE: To protect private facilities under Special Use permit on National Forest System Lands. Prevent occupancy within the boundary of the permitted site to protect private property and the immediate site from sound, sights and smells of oil and gas related activities.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains permitted recreation residences or organization camps.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the recreation residences, ski area or organization camp site boundaries have changed.

TIMING

RESOURCE: Recreation residences and organization camps.
STIPULATION: Surface use is prohibited from May 15 through September 15 within 0.25 mile from the site boundary of recreation residences and organization camps under Special Use Permit by the Forest Service. This stipulation does not apply to the operation and maintenance of production facilities.
OBJECTIVE: To protect private facilities under Special Use on National Forest System Lands. Prevent occupancy within 0.25 of the boundary of the permitted site to protect private property and the setting from visual, sound and odor effects produced by oil and gas related activities during the principal time of occupancy.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of recreation residences and organization camps and associated use.
EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The area affected by this stipulation may be modified by the authorized officer if it is determined that portions of the area are no longer under Special Use Permit or the use has changed. The dates for the timing restriction may be modified if new recreational use information indicates that the dates are not valid for the leasehold.

TABLE E-S21

Summary of Stipulation for Facilities

By Management Area and Alternative

RESOURCE	MANAGEMENT AREA	ALT. 2	ALT. 3	ALT. 4	ALT.4A	ALT. 5
FS Facilities	P-All	NSO	NSO	NSO	NSO	ST

NO SURFACE OCCUPANCY

RESOURCE: Management Area P--administrative facilities.
STIPULATION: Surface occupancy is prohibited within the site boundary of MA P-administrative facilities.
OBJECTIVE: To protect Forest Service administrative facilities. To prevent occupancy within the site area that would cause direct effects to the administrative facilities or the immediate setting by surface disturbance, removal of vegetation, and visual, odor and sound impacts.
WAIVER: This stipulation may be waived by the authorized officer if it is determined that the entire leasehold no longer contains portions of administrative facilities.

EXCEPTION: An exception to this stipulation may be granted by the authorized officer if the operator demonstrates in a plan of operations that impacts from the proposed action are acceptable or can be adequately mitigated.
MODIFICATION: The areas affected by this stipulation may be modified by the authorized officer if it is determined that the administrative facility boundaries have changed.

APPENDIX F

Analysis Methodologies

APPENDIX F: Analysis Methodologies

The Beartooth Mountains Oil and Gas EIS analysis area utilized the MOSS family of Geographic Information System (GIS) software for encoding, transforming, analyzing, and displaying spatial information. This system consists of three components: the Automated Digitizing System (ADS); The Analytical Mapping System (AMS) for digital data entry; the Map Overlay and Statistical System (MOSS) and Map Analysis and Processing System (MAPS) for data processing, analysis, and display; and the Cartographic Output System (COS) for plotting.

MOSS has been designed to allow retrieval, analysis, map displays, and other spatial data stored in the system. This map data may be stored in two formats: vector or cell (raster). Vector data consists of a series of (x,y) coordinates forming points, lines or polygons. Each feature in a vector map may be assigned an identifying attribute based on its characteristics. Cell data consists of a regular grid pattern in which each cell in the grid is assigned an identifying value and may be created from vector data by a process called rasterizing. Accuracy, resolution, storage, and processing of cell maps is directly related to grid-cell size. For this EIS each grid-cell is equal to ten acres.

The GIS data base was digitized from resource maps at the 1:24,000 or 1:100,000 scale. Maps for this EIS have been generated at a scale to allow the reader a general idea regarding the nature of the area.

Both vector and raster acreages have been used in this EIS. Chapter 3 uses the vector map data (polygon) and included all lands within the decision area. There are approximately 9,000 acres of private or State lands within the decision area. Chapter 4 used raster map data (10 acre grid-cells) and excluded inholdings within the decision area to display only National Forest System acreages. Consequently, acreage figures between Chapter 3 and 4 cannot be compared directly.

The lease stipulations identified on the alternative maps would apply only to the National Forest System lands. They do not apply to any lands of other ownerships within the EIS study boundary. These private holdings may not appear on the maps due to scale reduction.

APPENDIX G

Maps

APPENDIX G: MAPS

MAP 1

- High Hazard and Fragile Soils
- Sensitive Plant Habitat
- Sensitive Plant Sites

MAP 2

- Roadless Areas
- Slopes Greater Than 40 Percent

MAP 3

- Bald Eagle
- Peregrine Falcon
- Grizzly Bear
- Yellowstone Cutthrout Trout

MAP 4

- Elk

MAP 5

- Muledeer
- Moose

MAP 6

- Recreation
- Recreation Spectrum
- Recreation Sites

MAP 7

- Mountain Goat
- Bighorn Sheep

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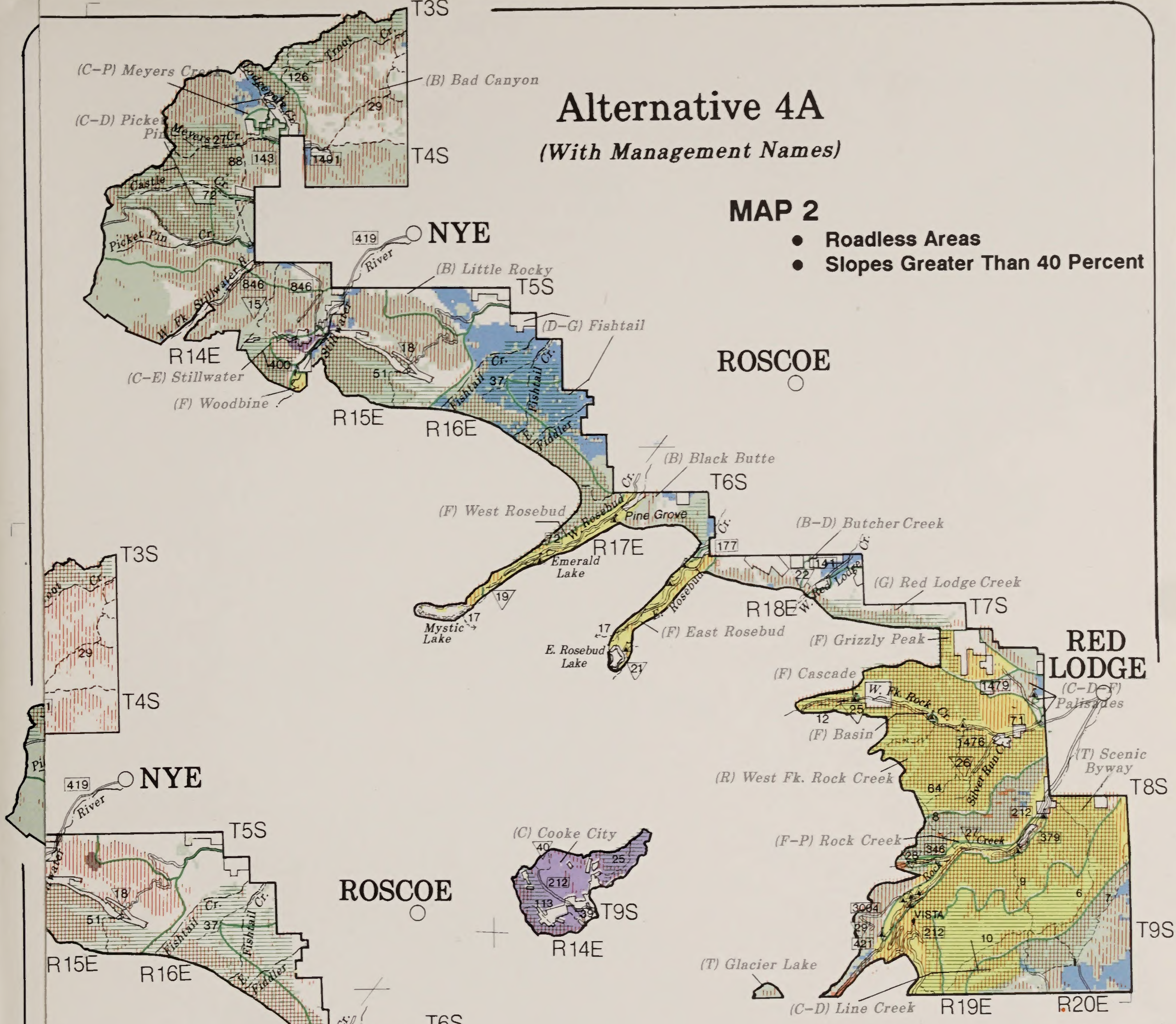
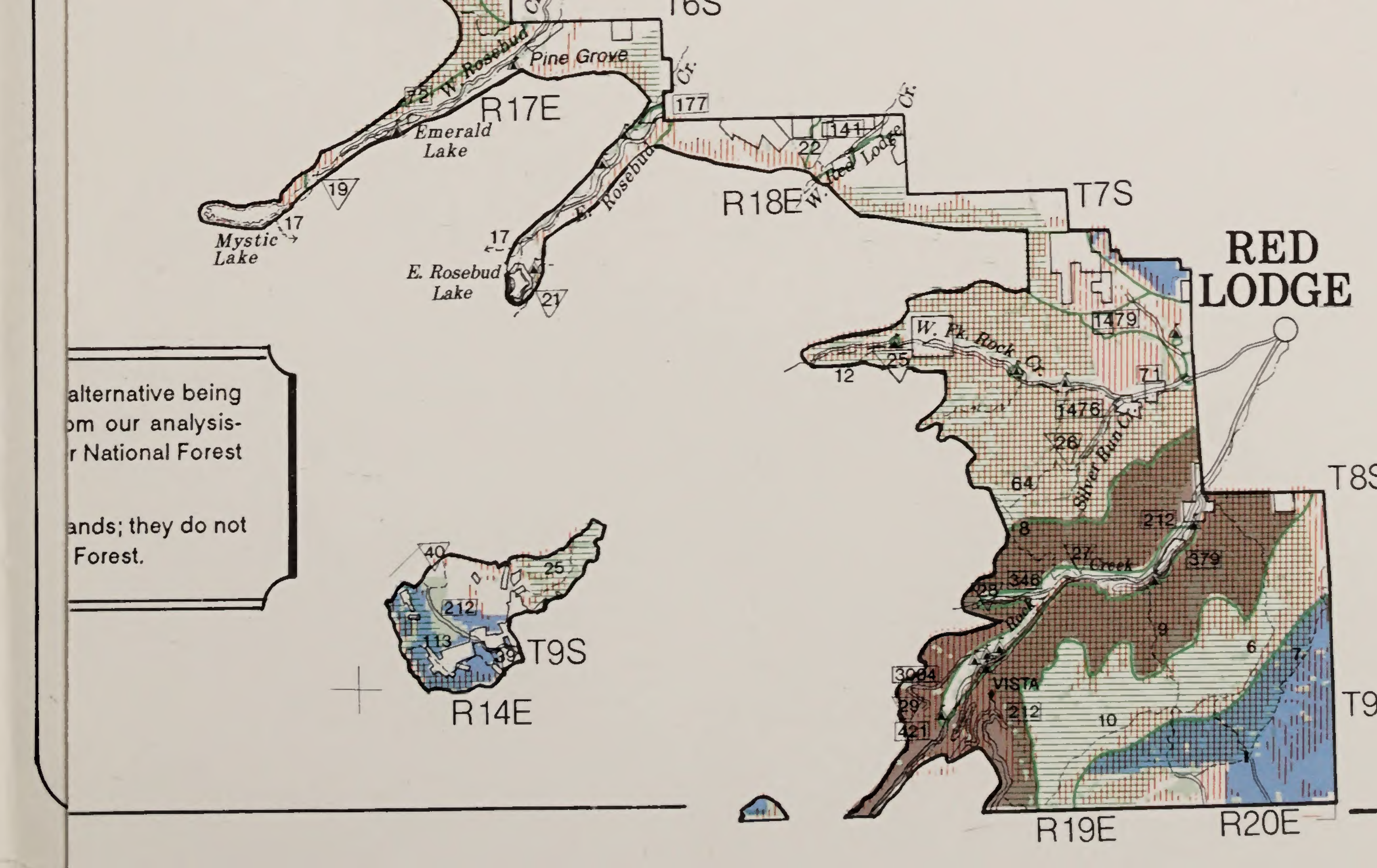
Alternative 4A

(With Management Names)

MAP 2

- **Roadless Areas**
- **Slopes Greater Than 40 Percent**





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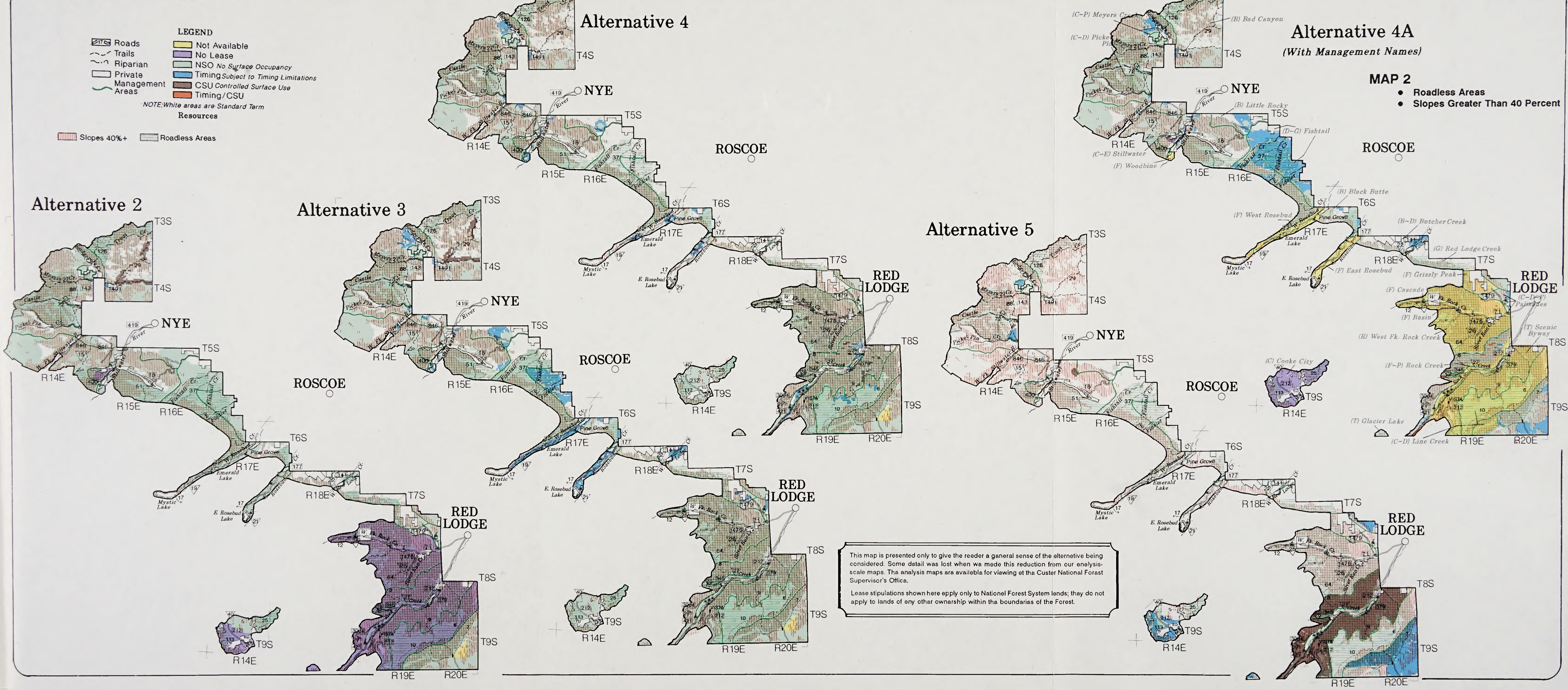
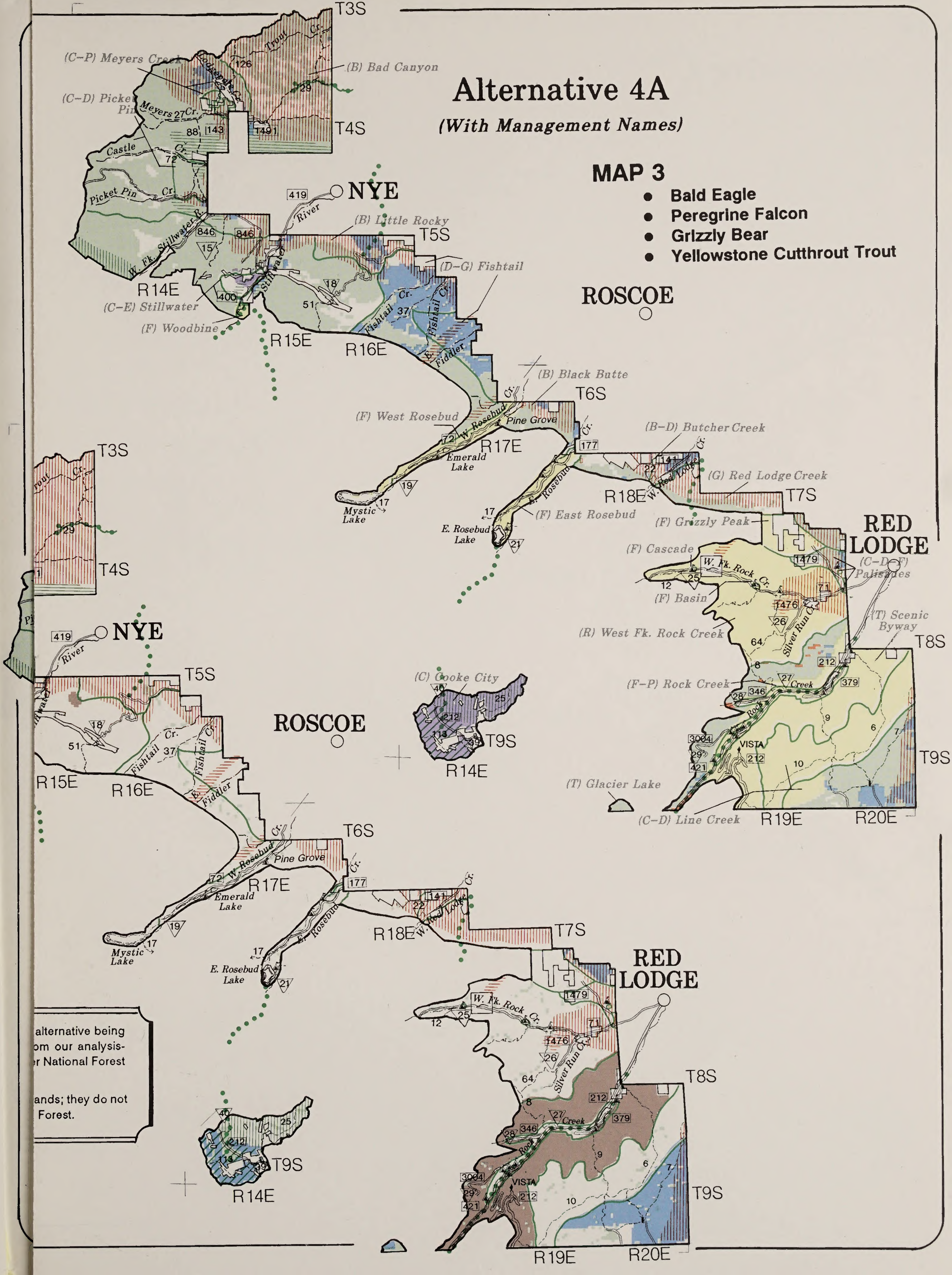
Slopes 40%/Roadless



This map is presented only to give the reader a general sense of the alternative being considered. Some detail was lost when we made this reduction from our analysis-scale maps. The analysis maps are available for viewing at the Custer National Forest Supervisor's Office.

Lease stipulations shown here apply only to National Forest System lands; they do not apply to lands of any other ownership within the boundaries of the Forest.



Alternative 4A

(With Management Names)

MAP 3

- ● Bald Eagle
- ● Peregrine Falcon
- ● Grizzly Bear
- ● Yellowstone Cutthrout Trout

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Eagles–Falcons/Grizzly Bear/Trout

LEGEND

- ▭ Roads
- ╌ Trails
- ∼ Riparian
- ▭ Private
- ∼ Management Areas

- 🟨 Not Available
- 🟪 No Lease
- 🟩 NSO *No Surface Occupancy*
- 🟦 Timing *Subject to Timing Limitations*
- 🟫 CSU *Controlled Surface Use*
- 🟧 Timing/CSU

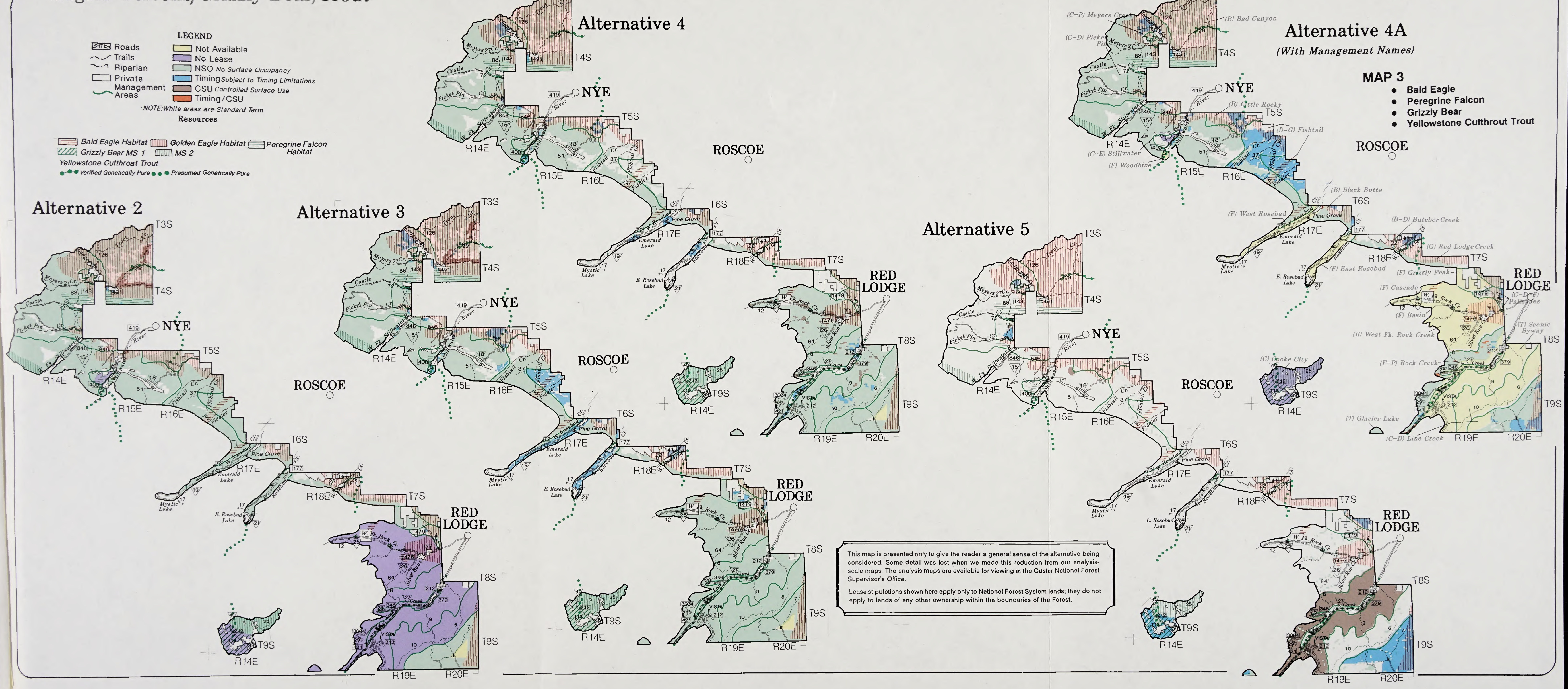
NOTE; White areas are Standard Term

Resources

- ▤ *Bald Eagle Habitat*
- ▥ *Golden Eagle Habitat*
- ▤ *Peregrine Falcon Habitat*
- ▨ *Grizzly Bear MS 1*
- ▥ *MS 2*

Yellowstone Cutthroat Trout

- ●–● *Verified Genetically Pure*
- ● ● ● *Presumed Genetically Pure*



Alternative 2

Alternative 3

Alternative 4

Alternative 5

Alternative 4A

(With Management Names)

MAP 3

- Bald Eagle
- Peregrine Falcon
- Grizzly Bear
- Yellowstone Cutthrout Trout

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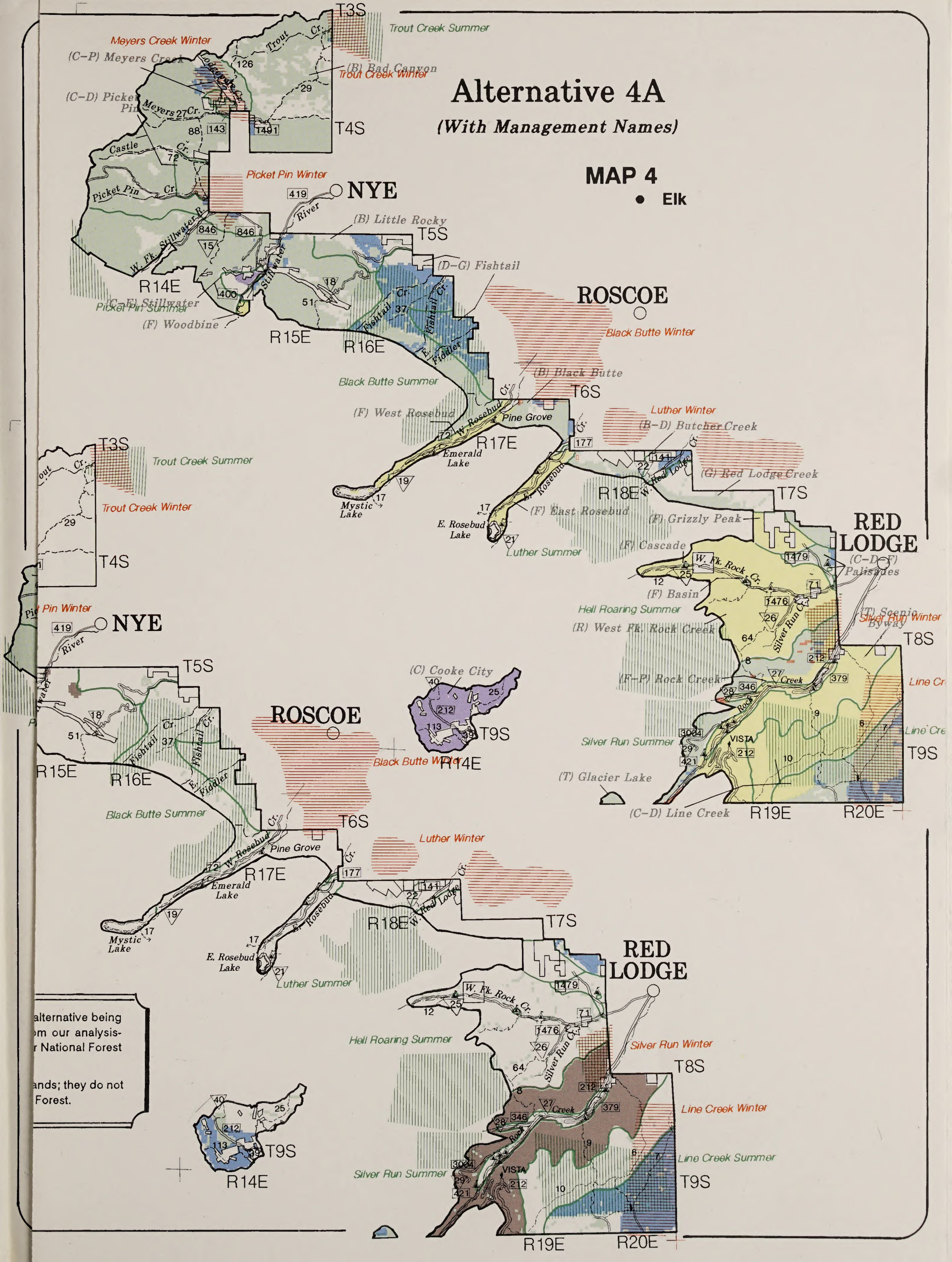
Alternative 4A

(With Management Names)

MAP 4

● Elk



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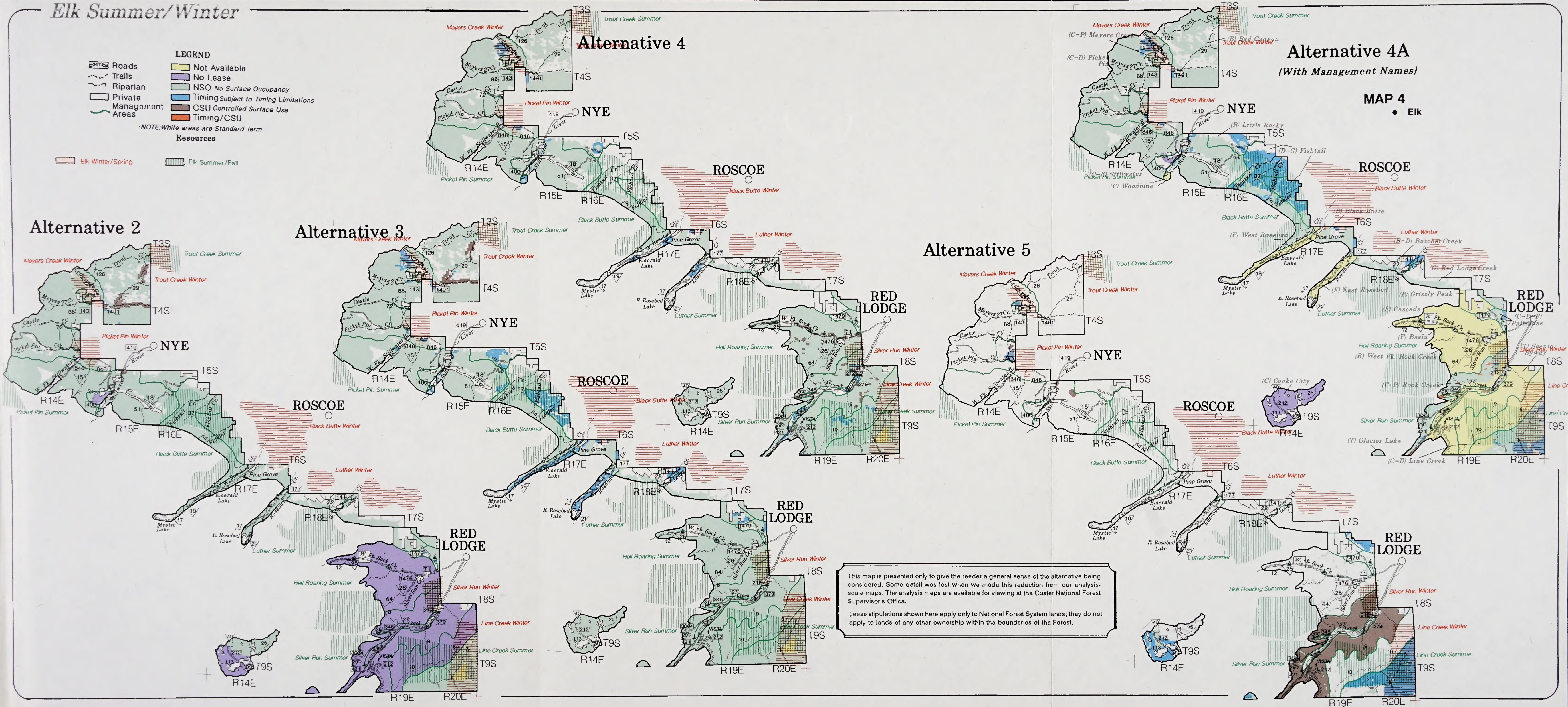
Elk Summer/Winter

MAP 4

● Elk



LEGEND

- Roads
- Trails
- Riparian
- Private
- Management Areas

🟨	Not Available
🟪	No Lease
🟩	NSO *No Surface Occupancy*
🟦	Timing *Subject to Timing Limitations*
🟫	CSU *Controlled Surface Use*
🟧	Timing/CSU

NOTE: White areas are Standard Term

Resources

▤ Elk Winter/Spring

▥ Elk Summer/Fall

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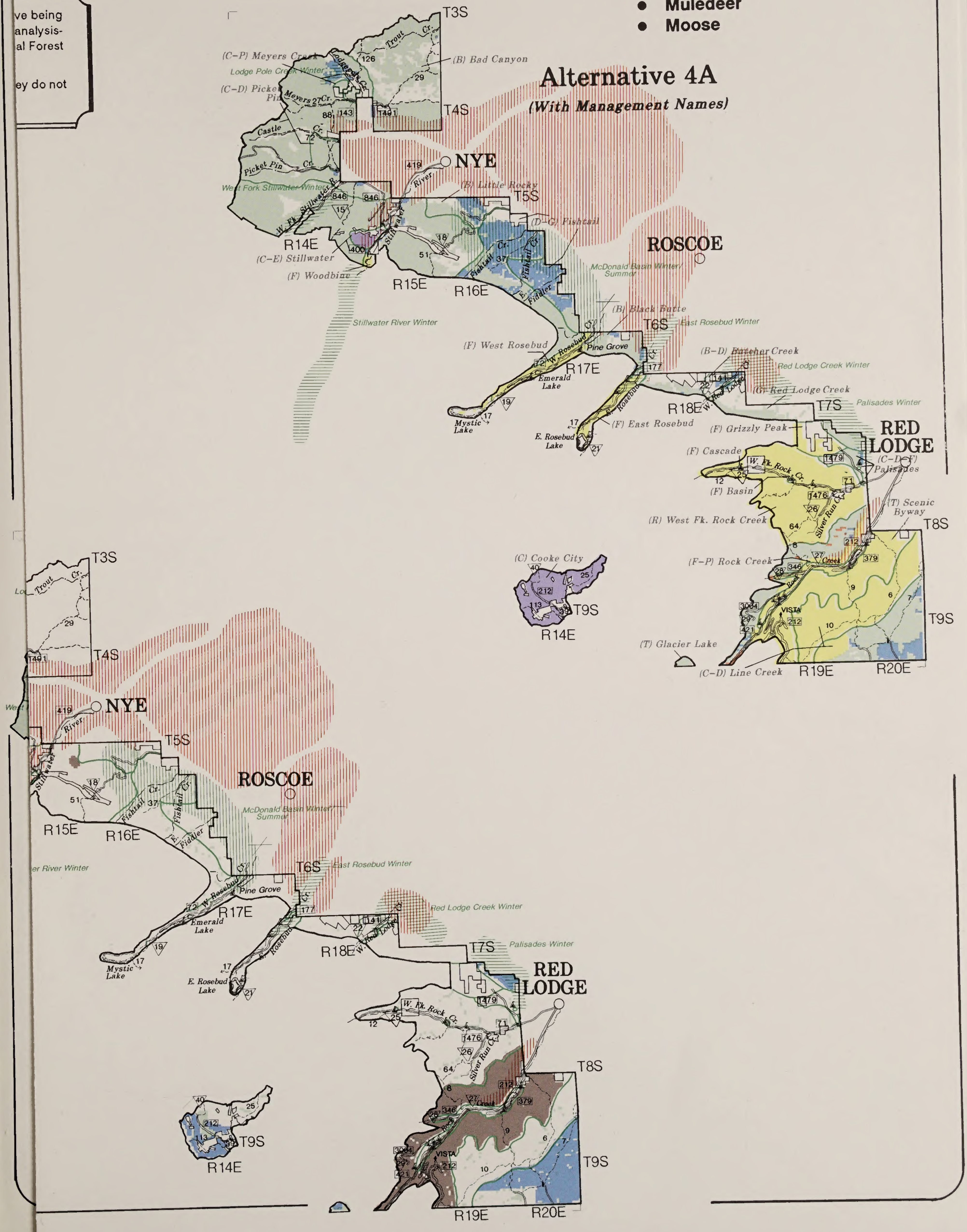
MAP 5

● Muledeer
● Moose

Alternative 4A

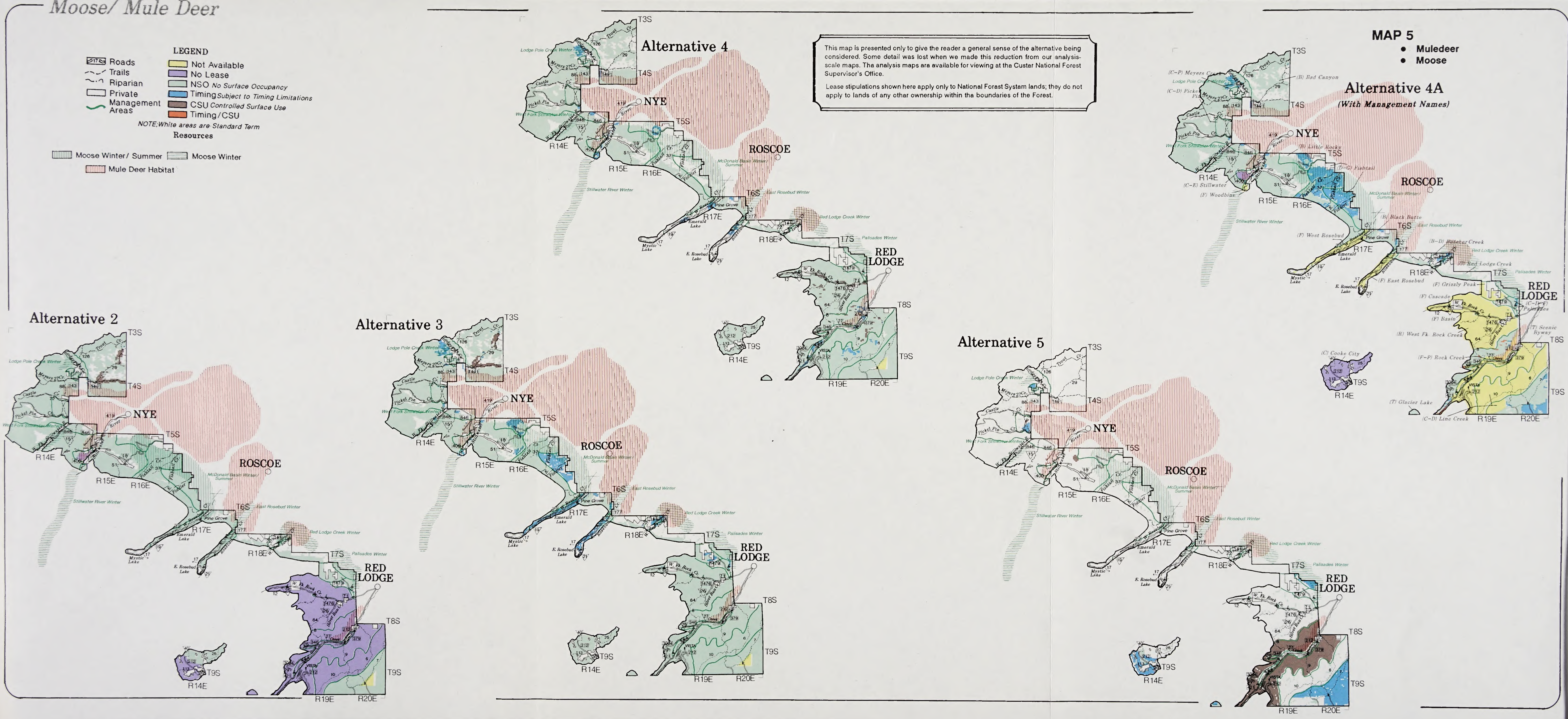
(With Management Names)



Moose/ Mule Deer

MAP 5

- Muledeer
- Moose



LEGEND

- 🛣 Roads
- Trails
- Riparian
- ☐ Private
- Management Areas
- 🟨 Not Available
- 🟪 No Lease
- 🟩 NSO *No Surface Occupancy*
- 🟦 Timing *Subject to Timing Limitations*
- 🟫 CSU *Controlled Surface Use*
- 🟧 Timing/CSU

NOTE; White areas are Standard Term

Resources

- ▥ Moose Winter/ Summer
- ▤ Moose Winter
- ▥ Mule Deer Habitat

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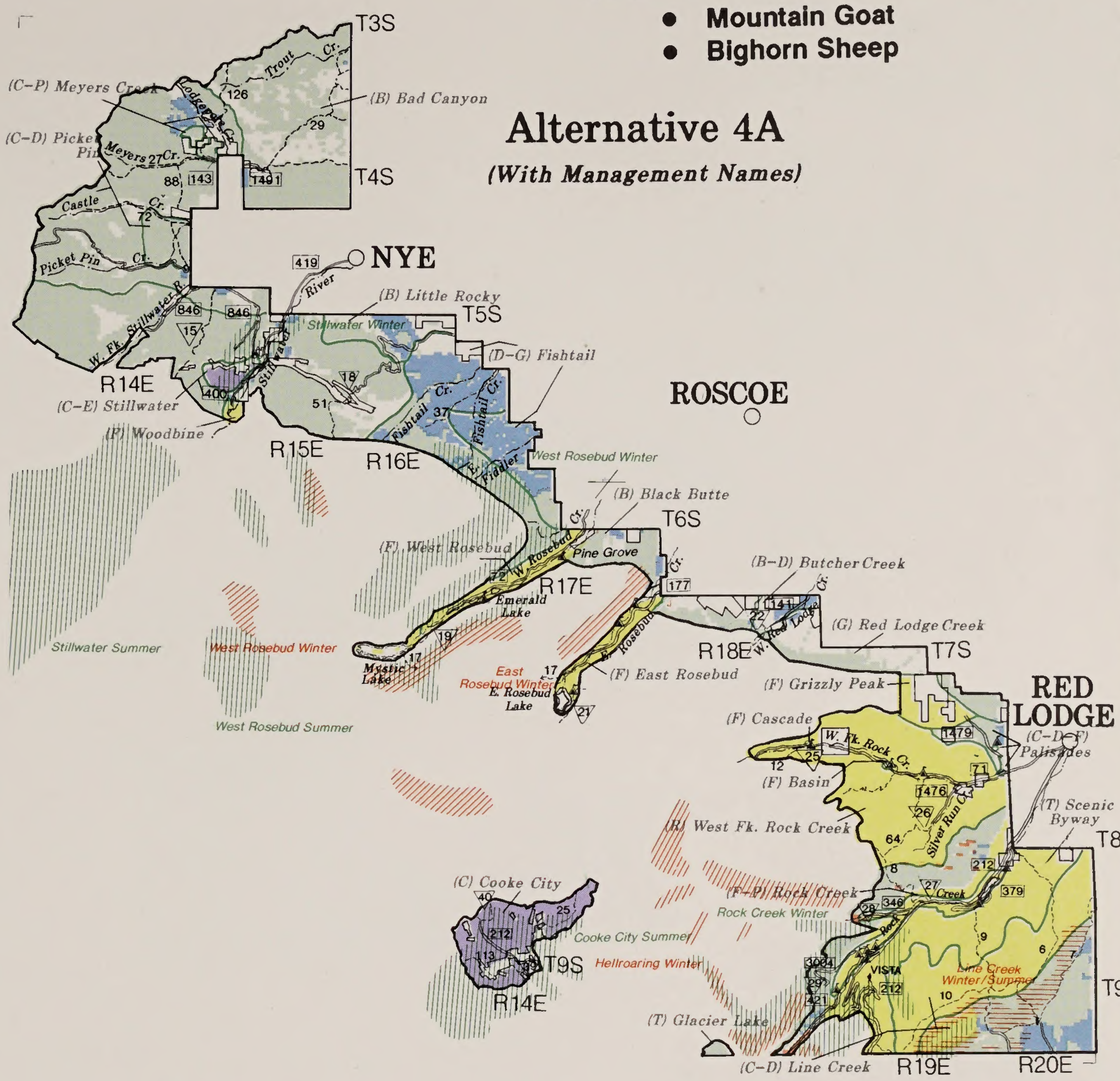
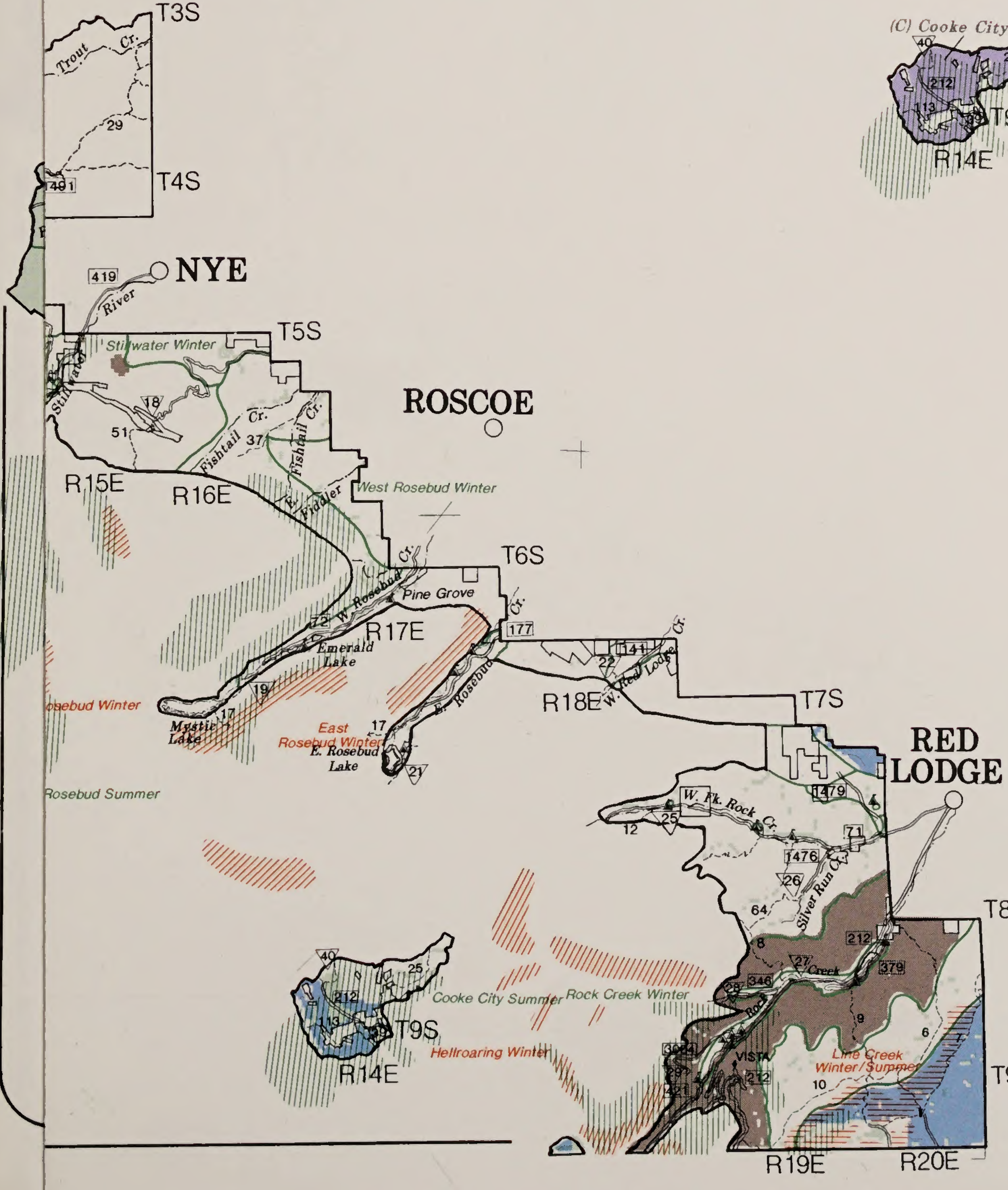
MAP 7

- ● **Mountain Goat**
- ● **Bighorn Sheep**

Alternative 4A

(With Management Names)





Sheep/Goats

MAP 7

- ● Mountain Goat
- ● Bighorn Sheep

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LEGEND

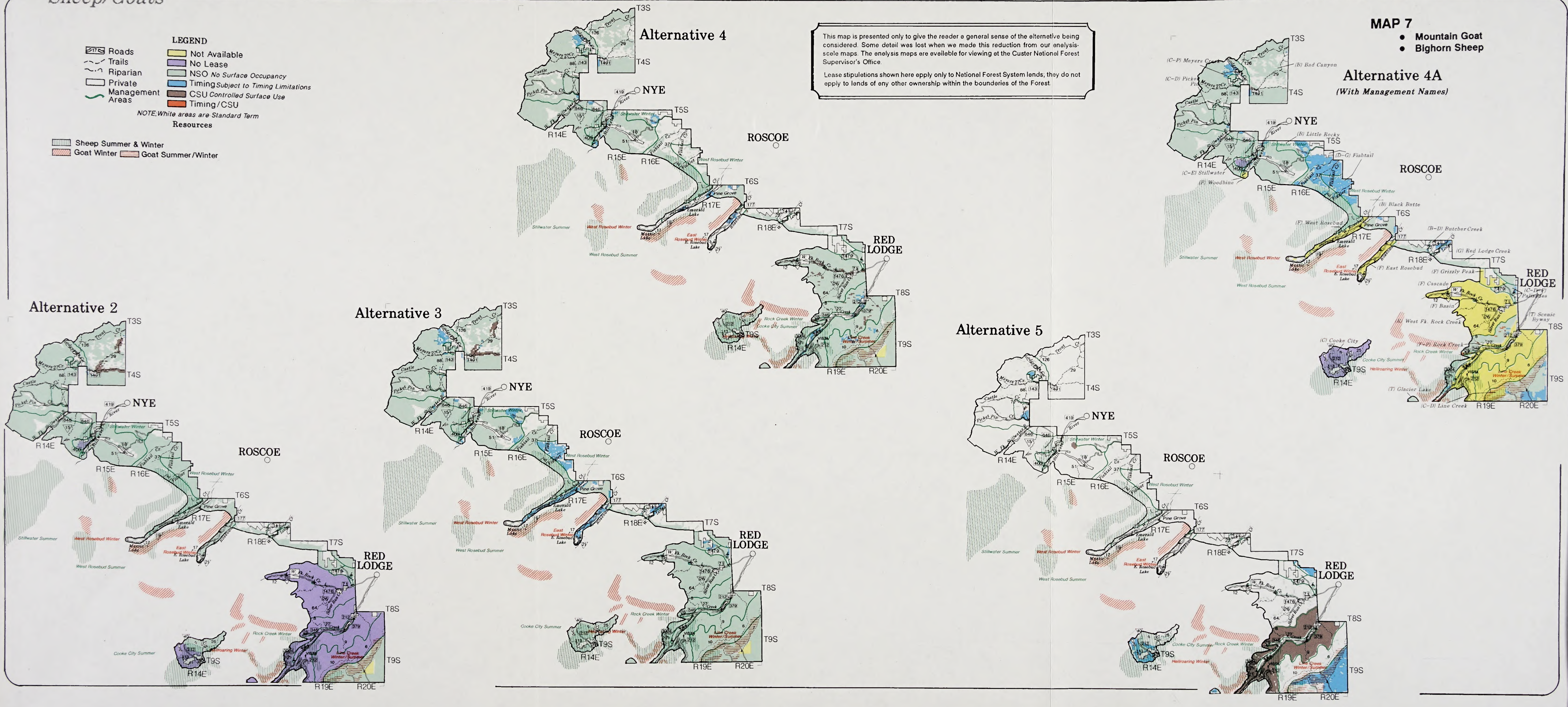
- Roads
- Trails
- Riparian
- ☐ Private
- Management Areas

- 🟨 Not Available
- 🟪 No Lease
- 🟩 NSO *No Surface Occupancy*
- 🟦 Timing *Subject to Timing Limitations*
- 🟫 CSU *Controlled Surface Use*
- 🟥 Timing/CSU

NOTE: White areas are Standard Term

Resources

- ▥ Sheep Summer & Winter
- ▨ Goat Winter
- ▤ Goat Summer/Winter



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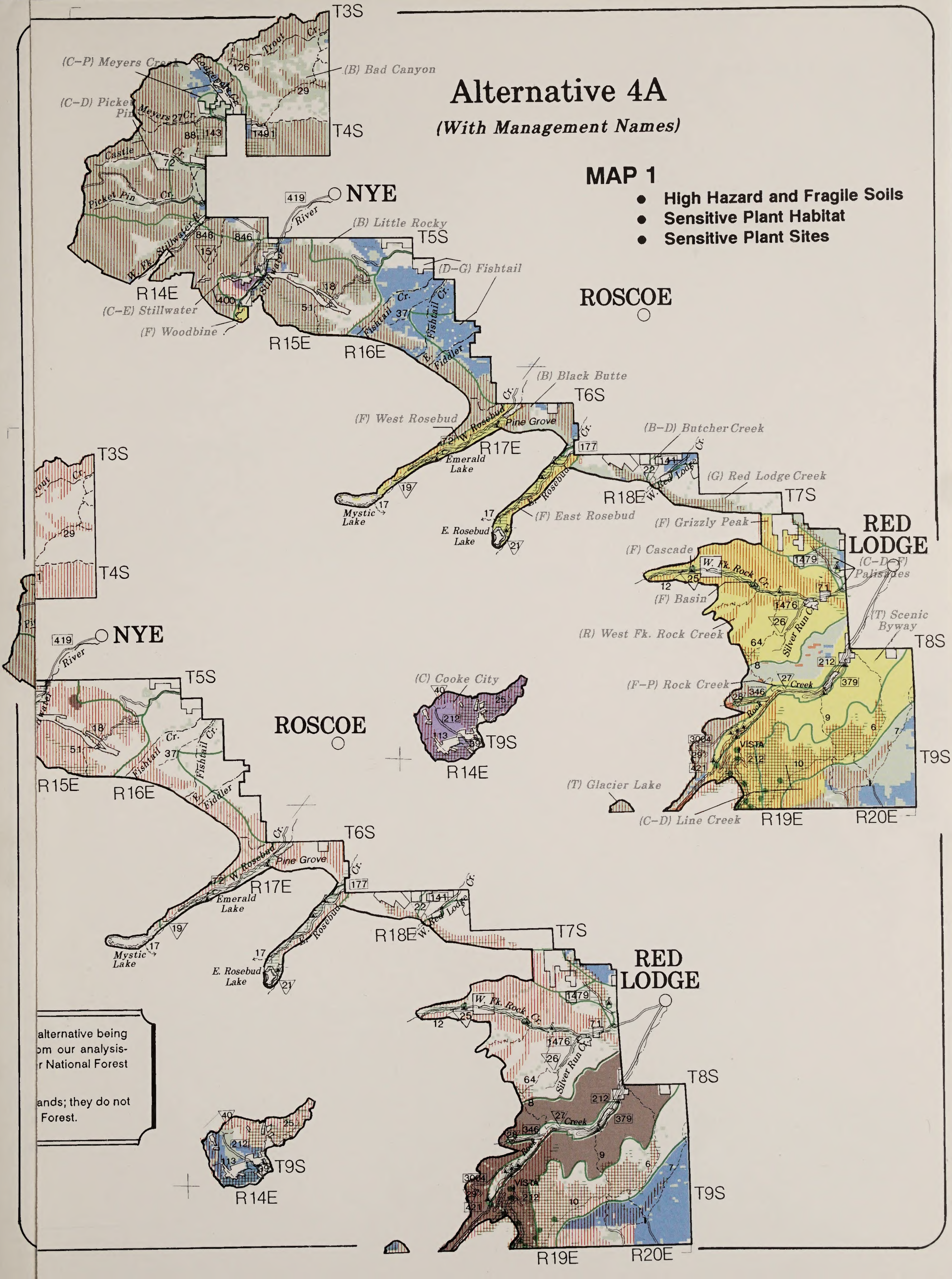
Alternative 4A

(With Management Names)

MAP 1

- High Hazard and Fragile Soils
- Sensitive Plant Habitat
- Sensitive Plant Sites



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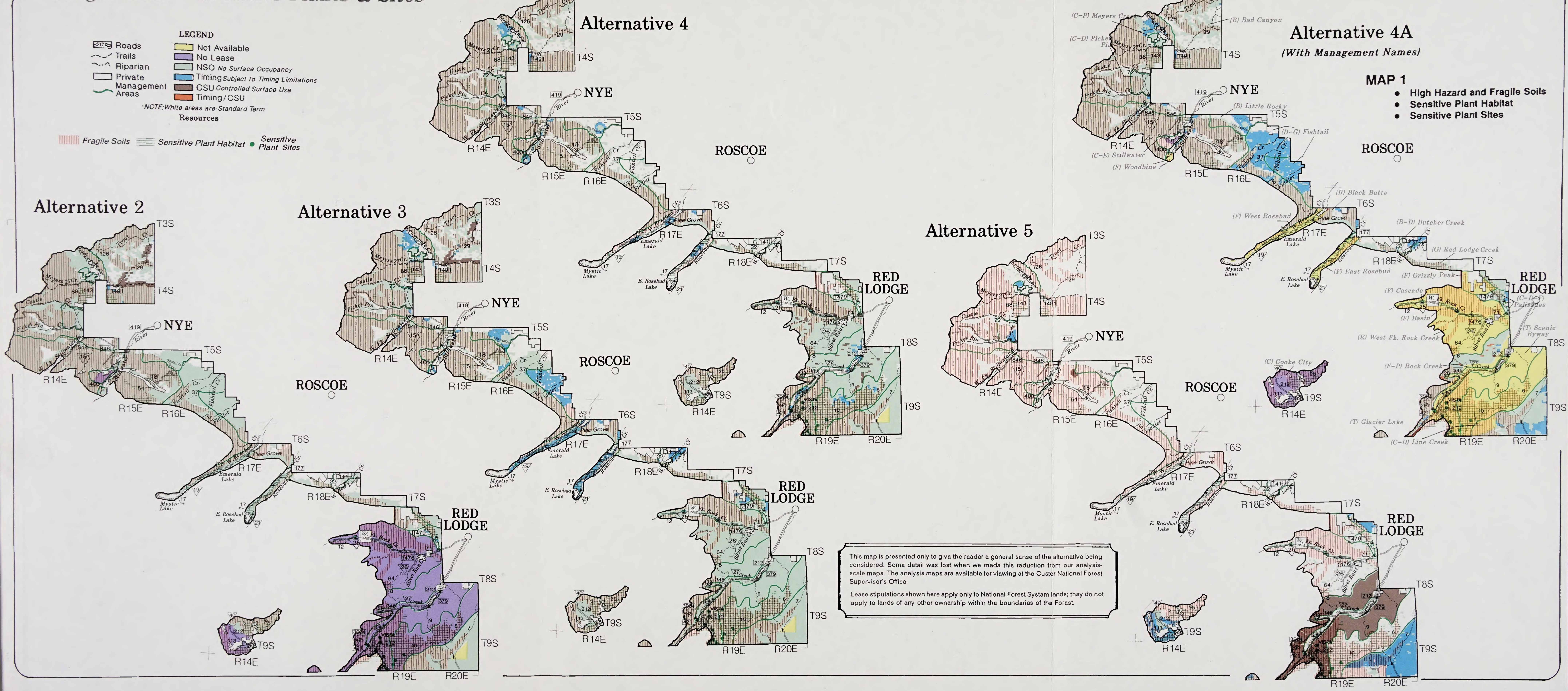
Fragile Soils – Sensitive Plants & Sites

MAP 1

- High Hazard and Fragile Soils
- Sensitive Plant Habitat
- Sensitive Plant Sites



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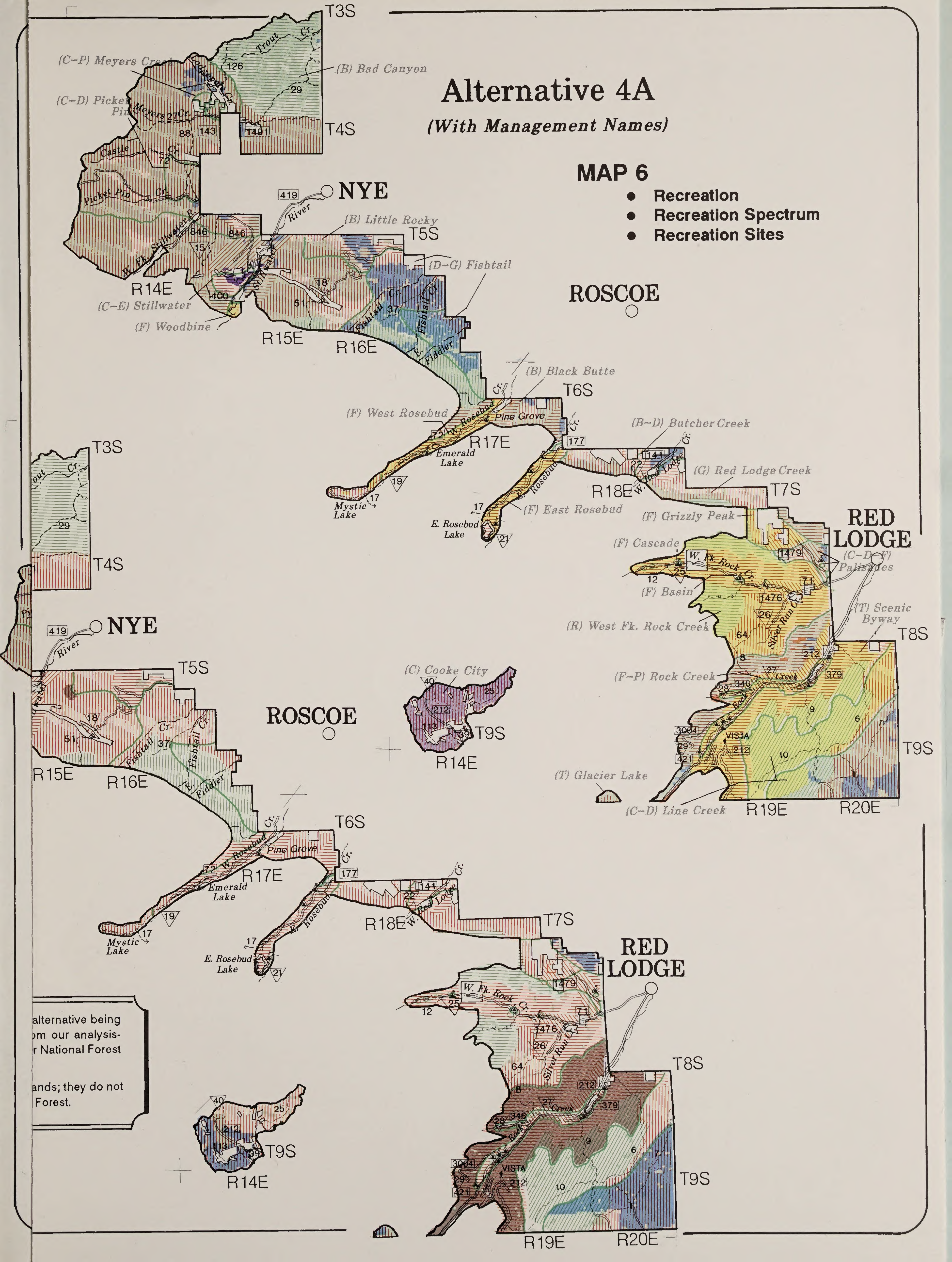
Alternative 4A

(With Management Names)

MAP 6

- **Recreation**
- **Recreation Spectrum**
- **Recreation Sites**



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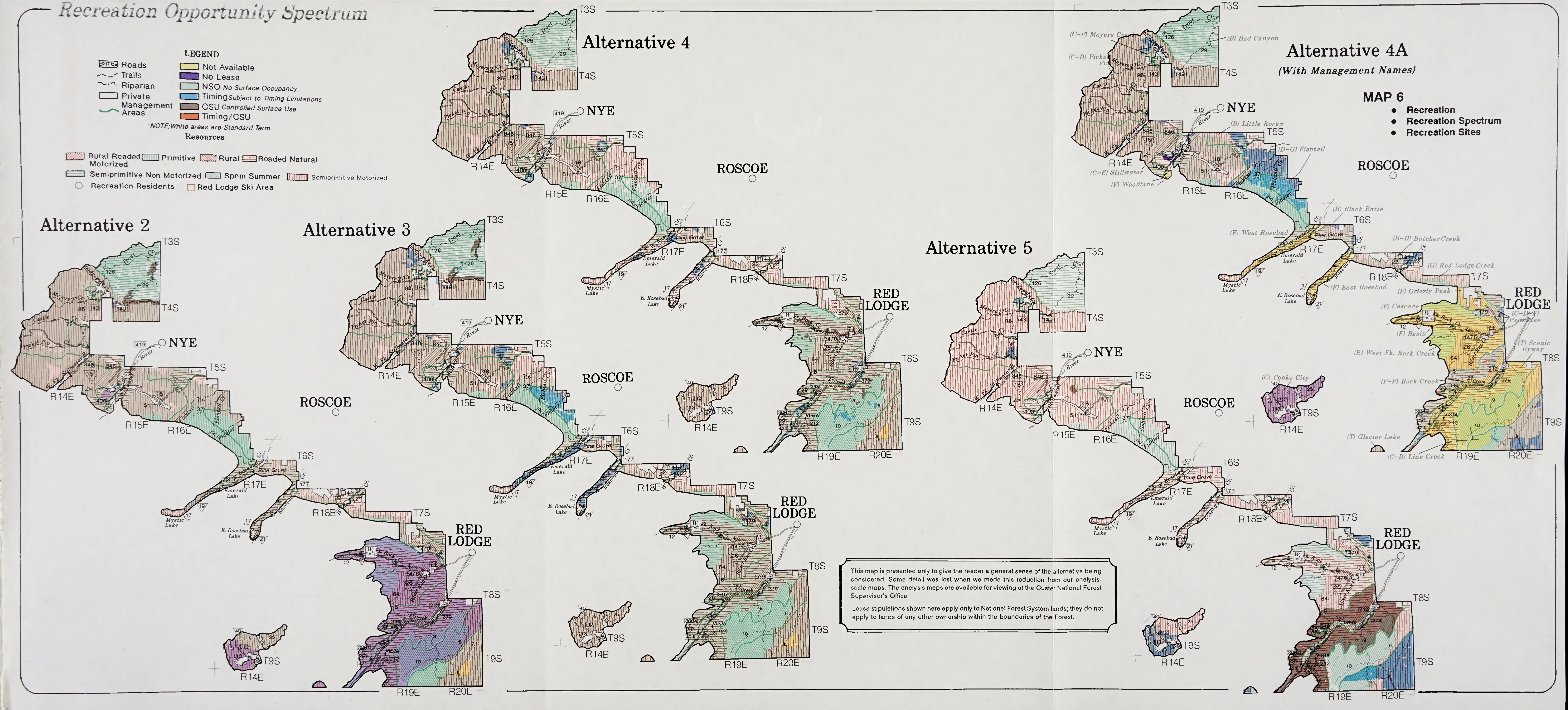
Recreation Opportunity Spectrum



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